INTERNATIONAL ABSTRACTS OF SURGERY

VOLUME 88 MAY, 1949 NUMBER 5

COLLECTIVE REVIEW

FRACTURES OF THE HIP

Methods of Treatment in Use at the Present Time

JOHN E. SUMMERS, M.D., Norwalk, Connecticut

TO obtain some idea as to the methods of treating fractures of the hip which are in vogue at the present time, questionnaires were sent to the chiefs of the orthopedic services of the hospitals listed in the *Journal of the American Medical Association* (1947, vol. 134) as being approved for residency training in orthopedic surgery. One hundred and fourteen of the replies were considered specific enough to be included in this study.

The fractures of the hip joint herein considered are intracapsular and extracapsular (intertrochanteric) fractures of the neck of the femur. Both types occur most commonly in elderly women.

Watson-Jones also divides these fractures into two types: abduction fractures, which occur at the subcapital level and are impacted, and adduction fractures, which occur at any level of the neck. Pauwels has determined that the obliquity of the fracture line through the neck determines the probability of union; the more horizontal the plane of fracture, the greater the probability of union; the more vertical the plane of fracture, the greater the improbability of union.

INTRACAPSULAR FRACTURES

Peculiar features. Intracapsular fractures of the neck of the femur are notorious for failing to unite and/or result in aseptic necrosis of the femoral head (15, 19, 24, 25, 48, 89, and 131). These complications arise because of the nature of the blood supply to the neck and head (19, 35, and 129). In the healing of these fractures no periph-

Resident in Orthopedic Surgery, The Norwalk Hospital.

eral callus is laid down because of the absence of a cambium layer on the femoral neck.

Nonoperative treatment of femoral neck fractures. While the Whitman method of treatment of femoral neck fractures by accurate reduction and maintenance of position by a plaster of paris spica was a great advance, it carried a high mortality rate because of the fixation of the elderly patient in bed. Cleveland and Bosworth (25) reviewed the cases of 50 patients treated with the Whitman spica, finding that the immediate mortality was 14 per cent, and that 38 per cent of the survivors obtained bony union of the fracture.

Operative treatment of femoral neck fractures. It is now believed that early reduction and pinning of the fragments is the treatment of choice. One hundred and eleven orthopedic surgeons, of the 114 corresponded with, prefer to use internal fixation for intracapsular fractures of the femoral neck. Only 3 surgeons recommend the use of casts or traction.

Ninety-five of the 111 surgeons who operate on patients with femoral neck fractures use the Smith-Petersen nail, the great majority using the cannulated nail and introducing it blindly over a guide wire under roentgen-ray control (1, 4, 6, 8, 9, 10, 13, 14, 21, 23, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 49, 50, 52, 53, 54, 55, 56, 57, 58, 61, 65, 66, 67, 69, 70, 72, 73, 74, 76, 77, 78, 81, 84, 85, 90, 91, 93, 94, 95, 96, 98, 99, 102, 107, 108, 109, 110, 112, 114, 115, 116, 117, 119, 121, 122, 124, 125, 126, 127, 128, 130, 132, 136, 137, 141, 144, 146, 147, 151, 150a, 154, 155, 156, 157a, 159, 160, 161, 162, and 164).

Various other types of nails, pins, screws, and bolts are used by the other 18 surgeons (5, 20, 22, 31, 33, 34, 36, 51, 59, 60, 62, 79, 80, 83, 86, 87, 88, 103, 105, 106, 120, 133, 140, 142, 143, 149, and 163).

When the fracture is impacted, in the abduction type, some operators use a conservative splintage without operation (38, 50, 57, 78, and 108).

La Ferte performs a McMurray type of osteotomy for all fresh fractures of the femoral neck.

As mentioned, an attempt has been made to anticipate those fractures which will not heal because of the plane of the fracture line through the femoral neck. It is believed that when the fracture tends to be vertical, that is, parallel with the long axis of the shaft of the femur, the prognosis for union is bad, even with accurate reduction and proper pinning of the fragments. Accordingly, some surgeons are now performing an immediate osteotomy, with or without internal fixation, for this type of fracture (13, 68, 73, 85, 109, 112, and 147).

Results of operation for femoral neck fractures. Boyd and George (15, 15a) reviewed 360 cases of fracture of the neck of the femur treated by operation, and found a mortality of 7 per cent, bony union in 84.7 per cent, and aseptic necrosis of the femoral head in 60 per cent of the patients with nonunion and in 33 per cent of those with union. These authors state that internal fixation is the treatment of choice for acute femoral neck fractures, because "the mortality is lower, the patient is more comfortable, medical complications are less frequent, the percentage of senile psychosis is greatly reduced, the cost of hospitalization is diminished and the percentage of bony union is greater than with any other method."

EXTRACAPSULAR (INTERTROCHANTERIC) FRACTURES

It has previously been thought that intertrochanteric fractures of the femur should be treated by traction or other conservative methods (7, 89, and 138).

While nonunion of intertrochanteric fractures rarely occurs, malunion commonly occurs. Further, the mortality for intertrochanteric fractures is higher than that for femoral neck fractures (18, 32, and 119).

Operative treatment of intertrochanteric fractures. One hundred and four replies to the questionnaire concerning the treatment of intertrochanteric fractures were received. Eighty-three of the orthopedic surgeons prefer to treat intertrochanteric fractures of the femur by internal fixation. Twenty-six of these 83 use the Smith-Petersen nail and the Thornton plate (10, 13, 39, 43, 52, 65, 66, 67, 73, 77, 78, 82, 84, 96, 102, 107, 109, 114, 117, 125, 128, 130, 147, 154, 160, and 164); 20 use the Neufeld nail (21, 40, 47, 54, 55, 56, 90, 93, 94, 95, 99, 110, 111, 119, 137, 140, 143, 144, 150a, and 156); 23 use the Moore-Blount blade-plate (8, 9, 11, 41, 42, 45, 46, 49, 57, 58, 61, 62, 72, 74, 79, 83, 85, 91, 104, 105, 108, 124, 133, 136, 141, 142, and 162); 3 use the Smith-Petersen nail and the McLaughlin plate (97, 98, and 126); and 6 use the Jewett nail (14, 23, 26, 26a, 38, 71, 88, 122, and 127).

Nonoperative treatment of intertrochanteric fractures. Twenty-one surgeons prefer conservative treatment of intertrochanteric fractures.

The most popular type of conservative treatment is skeletal Russell traction (4, 6, 44, 70, 89, 112, 115, 132, 138, 155, 157, and 157a). Other forms of external fixation used are: the Roger-Andersen well leg splint (113, 121, and 161), Thommason double leg plaster cast (18), Buck's extension (20), pantaloon cast (32, 34), Wilkie boots (37), the Whitman cast (152), and the hanging cast (118).

Results of treatment of intertrochanteric fractures. From a study of 133 consecutive cases of intertrochanteric fractures of the femur, 38 of which were treated by traction and 95 by internal fixation, Cleveland, Bosworth, and Thompson (26, 26a) found that: (1) internal fixation reduced the hospital mortality to 12.6 per cent, as compared to 34 per cent after treatment in traction; and (2) severe senile mental deterioration occurred in 2.1 per cent of the patients following internal fixation, as compared to 11 per cent of the patients treated by traction.

O'Brien, Shy, and Bublis (110) reviewed 103 consecutive cases of patients with trochanteric fractures of the femur treated by operation and internal fixation; the most commonly used agent was the Neufeld nail-plate. The mortality was 21.4 per cent. Follow-up examination of 50 patients revealed excellent results in 74 per cent.

Nonunion of fractures of the femoral neck. The value of early and accurate reduction of these fractures by the proper application of the internal fixative agent and the prohibition of weight bearing until evidence of union on roentgen-ray examination has been manifested, and the incidence of nonunion has been decreased. To secure the best results, the following principles, expressed by Thomson should be kept in mind:

"1. The hips must be quite accurately reduced.

"2. If the head is in a little valgus with the neck, our ratio for success is better.

"3. A very long pin which will pass almost straight up from the shaft well into the head

through the lower portion of the neck gives more secure fixation than any other method."

However, nonunion of femoral neck fractures still presents a big problem. According to Boyd and George (15), Cleveland (23), and Dickson (39a), 13.5 per cent, 16 per cent, and from 18 to 20 per cent, respectively, of the fractures of the femoral neck operated upon go on to nonunion.

The majority of surgeons corresponded with prefer to perform a McMurray type of osteotomy, most of them fixing the fragments with a blade-plate (11) for nonunion of femoral neck fractures when the femoral head is alive (3, 10, 11, 12, 13, 23, 38, 40, 41, 42, 43, 44, 50, 51, 52, 54, 56, 58, 63, 64, 65, 67, 70, 72, 73, 75, 77, 82, 84, 85, 90, 92, 95, 96, 100, 101, 102, 105, 109, 112, 114, 117, 120, 121, 126, 128, 130, 137, 138, 139, 141, 144, 146, 151, 157a, 160, and 161).

Other types of operation which are in use are: bone grafting with or without pins (1, 4, 21, 34, 83, 122, 132, 140, and 164); the Brachett reconstruction operation (16, 49, 93, and 107); Shantz osteotomy (39, 78, 123, and 124); Leadbetter osteotomy (99, 131, 156, and 159); and the Whitman reconstruction operation (81, 133, and 163).

McLaughlin (98) writes, "Many patients with failure of bony union need no treatment." A patient with fibrous union, provided the pain is not too severe, may be able to get around with a cane or a walking caliper brace.

Aseptic necrosis of the femoral head. Aseptic necrosis of the femoral head occurs most commonly after nonunion of femoral neck fractures, but also develops after union of the fragments.

Boyd and George (15a) found the incidence of aseptic necrosis of the head of the femur to be 32.6 per cent among the patients that obtained union, while 59.3 per cent of the hips with nonunion showed aseptic necrosis.

Aseptic necrosis or degenerative arthritis of the femoral head after union of the femoral neck fracture has occurred should be treated by the prevention of weight bearing on the extremity to give the femoral head an opportunity to regenerate. Aseptic necrosis of the femoral head associated with nonunion of the intracapsular fracture of the neck of the femur is probably best treated by one of the reconstruction operations or arthrodesis of the hip joint.

The operative procedures now used for this condition are: the Whitman reconstruction operation (72, 84, 95, 128, 146, and 153); the Colonna reconstruction operation (27, 28, 62, 102, and 126); the McMurray type of osteotomy (13, 55, 116, and 140); vitallium mold arthroplasty (4, 10, 55, and 135); and trochanteric arthroplasty (158).

SUMMARY

Internal fixation is the treatment of choice for intracapsular and extracapsular fractures of the neck of the femur. The Smith-Petersen nail is used by most orthopedic surgeons for the internal fixation of femoral neck fractures. The Smith-Petersen nail, the Neufeld nail-blade, and the Moore-Blount blade-plate are used most frequently in the operative treatment of intertrochanteric fractures.

The early operative treatment of femoral neck fractures with accurate reduction of the fragments and prohibition of weight bearing until bony union has taken place will probably reduce the incidence of nonunion of the fracture and of aseptic necrosis of the femoral head. Immediate osteotomy for the vertical type of femoral neck fractures may be the answer to this problem.

The McMurray type of osteotomy, usually with the blade-plate to fix the fragments, is most generally used for treating nonunion of femoral neck fractures.

There is no generally accepted operative procedure for the treatment of aseptic necrosis of the femoral head.

REFERENCES

1. Adams, A. O. Personal communication, 1948.
2. Anderson, R., and McKibbin, W. B. J. Bone Surg., 1943, 25: 153.
3. Asbury, E. Arch. Surg., 1947, 55: 51.
4. Badgley, C. E. Personal communication, 1948.
5. Baker, L. D. Personal communication, 1948.
6. Barnard, H. L. Personal communication, 1948.
7. Bartels, W. P. J. Bone Surg., 1939, 21: 773.
8. Benjamin, H. C. Personal communication, 1948.
9. Berkett, G. D. B. Personal communication, 1948.
10. Bershon, A. L. Personal communication, 1948.
11. Blount, W. P. J. Bone Surg., 1943, 25: 319.
12. Idem. Personal communication, 1948.
13. Bost, F. C. Personal communication, 1948.
14. Bosworth, D. M. Personal communication, 1948.
15. Boyd, H. B., and George, I. L. J. Bone Surg., 1947, 29: 13.
15a. Idem. J. Am. M. Ass., 1948, 137: 1196.
16. Brackett, E. G. J. Bone Surg., 1938, 20: 93.
17. Cannaday, J. E. Personal communication, 1948.
18. Carruthers, F. W. J. Arkansas M. Soc., 1942, 38: 225–227.
19. Chandler, F. A. Wisconsin M. J., 1936, 35: 609–618.
20. Chatterton, C. C. Personal communication, 1948.
21. Chuinard, E. G. Personal communication, 1948.
22. Clayton, C. F. Personal communication, 1948.
23. Cleveland, M. Personal communication, 1948.
24. Idem. Surg. Gyn. Obst., 1942, 74: 529.
25. Cleveland, M., and Bosworth, D. M. Surg. Gyn. Obst., 1938, 66: 646.
26. Cleveland, M., Bosworth, D. M., and Thompson, F. R. J. Bone Surg., 1947, 29: 1049.
26a. Idem. J. Am. M. Ass., 1948, 137: 1186.
27. Colonna, P. C. J. Bone Surg., 1935, 17: 110.
28. Idem. South. M. J., 1939, 32: 65.
29. Idem. Am. J. Surg., 1948, 75: 415.

30. Idem. Personal communication, 1948.
31. COMPERE, E. L. J. Internat. Coll. Surgeons, Oct., 1940. 3: 401–410.
32. Idem. Mississippi Valley M. J., 1945, 67: 13–18.
33. Idem. Personal communication, 1948.
34. COMPERE, E. L., and BANKS, S. W. Pictorial Handbook of Fracture Treatment. Chicago: The Year Book Publishers, 1943.
35. COMPERE, E. L., and WALLACE, G. J. Bone Surg., 1942, 24: 831.
36. COMPERE, E. L., WALLACE, G., and LEE, J. Arch. Surg., 1942, 44: 327.
37. COURTEN, F. C. Personal communication, 1948.
38. CRAWFORD, H. B. Personal communication, 1948.
39. DAVIS, A. G. Personal communication, 1948.
39a. DICKSON, J. A. J. Am. M. Ass., 1948, 137: 1199.
40. DILLON, V. M. Personal communication, 1948.
41. DIVELEY, R. L. Personal communication, 1948.
42. DONALDSON, J. S. Personal communication, 1948.
43. ENGEL, N. Personal communication, 1948.
44. EGGERS, G. W. N. Personal communication, 1948.
45. EVELETH, M. S. Personal communication, 1948.
46. FARROW, R. C. Personal communication, 1948.
47. FOWLER, C. B. Personal communication, 1948.
48. Fracture Committee of the American Academy of Orthopaedic Surgeons. J. Bone Surg., 1941, 23: 386.
49. FRANTZ, C. H. Personal communication, 1948.
50. GARTNER, A. A. Personal communication, 1948.
51. GECKELER, E. O. Personal communication, 1948.
52. GEORGE, E. M. Personal communication, 1948.
53. GHORMLEY, J. W. Personal communication, 1948.
54. GIRARD, P. M. Personal communication, 1948.
55. HAGGART, G. E. Personal communication, 1948.
56. HAMPTON, O. P. Personal communication, 1948.
57. HAND, F. M. Personal communication, 1948.
58. HANNON, W. C. Personal communication, 1948.
59. HARMON, P. H. J. Bone Surg., 1945, 27: 128.
60. HATCHER, C. H. Personal communication, 1948.
61. HEBERLING, J. A. Personal communication, 1948.
62. HENDERSON, M. S. Personal communication, 1948.
63. HERMANN, O. J. N. England J. M., 1942. 226: 601.
64. Ibid., 1945, 232: 186.
65. Idem. Personal communication, 1948.
66. HITCHCOCK, H. H. Personal communication, 1948.
67. HOUGH, G. I. N. Personal communication, 1948.
68. HUDSON, O. C. J. Internat. Coll. Surgeons, 1947, 10: 412.
69. HUDSON, O. C., and BARTELS, W. P. J. Bone Surg., 1939, 21: 1001.
70. HUDSON, O. C. Personal communication, 1948.
71. JEWETT, E. L. J. Bone Surg., 1941, 23: 803.
72. JOHNSON, R. W. Personal communication, 1948.
73. JOSEPHSON, J. B. Personal communication, 1948.
74. KESSLER, M. D. Personal communication, 1948.
75. KEY, J. A. J. Bone Surg., 1943, 25: 737.
76. Idem. Personal communication, 1948.
77. KIDNER, F. C. Personal communication, 1948.
78. KING, D. Personal communication, 1948.
79. KLEINBERG, S. Personal communication, 1948.
80. KNOWLES, F. L. Wisconsin M. J., 1936, 35: 106.
81. KRIDA, A. Personal communication, 1948.
82. LA FERTE, A. D. Personal communication, 1948.
83. LANE, J. D. Personal communication, 1948.
84. LE COCQ, J. F. Personal communication, 1948.
85. LEWIN, P. Personal communication, 1948.
86. LIPPMANN, R. K. J. Mount Sinai Hosp., N. York, 1936, 3: 65.
87. Idem. Personal communication, 1948.
88. LIPSCOMB, E. J. Personal communication, 1948.
89. LONERGAN, R. C. South. M. J., 1947, 40: 605.
90. LUCAS, L. S. Personal communication, 1948.
91. MACEY, H. B. Personal communication, 1948.
92. MARKELL, W. O. Personal communication, 1948.
93. MARTEN, J. R. Personal communication, 1948.
94. MAZET, R. Personal communication, 1948.
95. MCBRIDE, E. D. Personal communication, 1948.
96. MCGAW, W. H. Personal communication, 1948.
97. MCLAUGHLIN, H. L. Am. J. Surg., 1947, 73: 150.
98. Idem. Personal communication, 1948.
99. MCLERNORE, Z. O. Personal communication, 1948.
100. MCMURRAY, T. P. J. Bone Surg., 1936, 18: 319.
101. MCMURRAY, J. P. Brit. M. J., 1938, 1: 330.
102. MITCHELL, C. L. Personal communication, 1948.
103. MOORE, A. T. Internat. Surg. Digest, 1935, 19: 323.
104. Idem. J. Bone Surg., 1944, 26: 52.
105. Idem. Personal communication, 1948.
106. MOORE, A. T., and GREEN, J. T. South. Surgeon, 1940, 9: 634.
107. MOORE, J. R. Personal communication, 1948.
108. NEVIASER, J. S. Personal communication, 1948.
109. NICHOLSON, J. T. Personal communication, 1948.
110. O'BRIEN, R. M. Personal communication, 1948.
111. O'BRIEN, R. M., SHY, J. C., and BUBLIS, N. J. J. Bone Surg., 1946, 28: 791.
112. O'CONNOR, D. S. Personal communication, 1948.
113. ORR, H. W. Personal communication, 1948.
114. OXFORD, T. M. Personal communication, 1948.
115. PACKARD, R. G. Personal communication, 1948.
116. PARNALL, E. Personal communication, 1948.
117. PATTERSON, R. Personal communication, 1948.
117a. PAUWELS, F. Der Schenkenhalsbruch; Ein Mechanische Problem: Grundlagen des Heilungsvorganges Prognose und kausale Therapie. Stuttgart: Ferdinand Enke, 1935.
118. POSCH, J. L., and ABBOTT, W. E. Am. J. Surg., 1945, 70: 369.
119. POTTS, F. N. Personal communication, 1948.
120. RANSOHOFF, N. S. Personal communication, 1948.
121. ROBERTS, W. M. Personal communication, 1948.
122. ROBERTSON, R. C. Personal communication, 1948.
123. SCHANZ, A. Muench. med. Wschr., 1922, 69: 930.
124. SCHMIDT, A. C. Personal communication, 1948.
125. SCHNEIDER, C. C. Personal communication, 1948.
126. SCHROCK, R. D. Personal communication, 1948.
127. SCHWARTZ, R. P. Personal communication, 1948.
128. SHERILL, J. D. Personal communication, 1948.
129. SHERMAN, M. S., and PHEMISTER, D. B. J. Bone Surg., 1947, 29: 19.
130. SIMON, H. T. Personal communication, 1948.
131. SIRIS, I. E., and MULHOLLAND, J. H. Am. J. Surg., 1947, 74: 535.
132. SMITH, E. T. Personal communication, 1948.
133. SMITH, H. W. Personal communication, 1948.
134. SMITH-PETERSEN, M. N., CAVE, E. F., and VAN GORDER, G. W. Arch. Surg., 1931, 23: 715.
135. SMITH-PETERSEN, M. N., LARSON, C. B., AUFRANC, O. E., and LAW, W. A. J. Bone & Joint Surg., 1947, 20: 41.
136. SOFIELD, H. A. Personal communication, 1948.
137. SPEED, J. S. Personal communication, 1948.
138. SPEED, K. Surg. Clin. N. America, 1948, 28: 230.
139. STEINDLER, A. Personal communication, 1948.
140. STRYKER, H. H. Personal communication, 1948.
141. SWEET, J. H. T. Personal communication, 1948.
142. TAYLOR, G. M. Personal communication, 1948.
143. THOMPSON, V. P. Personal communication, 1948.
144. THOMSON, J. E. M. Personal communication, 1948.
145. THORNTON, L. Piedmont Hosp. Bull., 1937, 10: 21.
146. TRAMER, A. W. Personal communication, 1948.

147. TURNER, V. C. Personal communication, 1948.
148. VENABLE, C. S., and STUCK, W. G. Ann. Surg., 1946, 123: 641.
149. VIRGIN, H., and MACAUSLAND, W. R. Ann. Surg., 1945, 122: 59.
150. WATSON-JONES. Fractures and Joint Injuries. Vol. 1. Baltimore: Williams and Wilkins, 1946.
151. WHITE, J. W. Personal communication, 1948.
150a. WEILAND, A. H. Personal communication, 1948.
152. WHITMAN, R. Ann. Surg., 1925, 81: 374.
153. Idem. Surg. Gyn. Obst., 1926, 43: 221.
154. WILLIS, T. A. Personal communication, 1948.
155. WILSON, C. H. Personal communication, 1948.
156. WILSON, E. H. Personal communication, 1948.
157. WILSON, M. J. N. York M. Coll. & Flower Hosp. Bull., 1938, 2: 71.
157a. Idem. Personal communication, 1948.
158. WILSON, P. D. J. Bone Surg., 1947, 29: 313.
159. Idem. Personal communication, 1948.
160. WINKLER, H. Personal communication, 1948.
161. WISHNER, J. G. Personal communication, 1948.
162. WYCKOFF, H. J. Personal communication, 1948.
163. YERGASON, R. M. Personal communication, 1948.
164. YOUNT, C. C. Personal communication, 1948.

ABSTRACTS OF CURRENT LITERATURE

SURGERY OF THE HEAD AND NECK

HEAD

Tumors of the Lower Jaw (Tumores da mandíbula). MÁRIO KROEFF and ALBERTO COUTINHO. *Rev. brasil. cancerol.*, 1947, 1: 5.

The following classification of tumors of the mandible, adopted by the National Cancer Service of Brazil, is offered by the authors:

1. Tumors of dental origin: (a) odontogenic cyst: follicular, radicular, or periodontal; (b) adamantinoma; (c) odontoma.
2. Mesenchymal tumors: (a) fibroma, (b) chondroma, (c) osteofibroma, (d) osteoma, (e) sarcoma: fibrosarcoma, chondrosarcoma, osteogenic sarcoma, or reticulosarcoma (Ewing tumor or myelosarcoma).
3. Myeloplaxoma.
4. Myeloma.
5. Metastatic tumors: epithelial or mesenchymal.
6. Pseudotumors: (a) fibrous osteitis: Recklinghausen's disease, Paget's disease, or osseous leontiasis, (b) lymphogranulomatosis, (c) osteomyelitis, (d) syphilis, (e) tuberculosis.

Of 9,950 patients, 44 had primary tumors of the lower jaw. The histologic examination established the diagnosis of a giant cell tumor in 11 cases, adamantinoma in 6, odontogenic cyst in 5, fibroma in 18, osteoma in 1 case, and osteomyelitis in 3 cases.

The case histories are well illustrated.

The authors advocate the treatment of tumors of the jaw with electrocoagulation, by the so-called Kroeff technique. The coagulated bone segment is left *in situ*. As a rule, the sequestrum is eliminated spontaneously in about 8 weeks, which leaves a bridge of fibrous tissue that gradually becomes ossified. This type of treatment is employed by the authors in the majority of primary and secondary tumors of the lower jaw. JOSEPH K. NARAT, M.D.

EYE

Sidelights on the Inferior Oblique Muscle. J. RINGLAND ANDERSON. *Brit. J. Ophth.*, 1948, 32: 653.

In the first portion of this article the author considers the anatomical features of the inferior oblique muscle and discusses in considerable detail the relationship of this muscle to the inferior rectus muscle. The sheaths of the muscles are most important in relation to surgery.

In the second portion he discusses the surgical approach to the muscle both for myomectomy and recession. The insertion of the muscle is not always constant as considerable variation has been noted.

Overaction of the inferior oblique muscle may be due to: (1) asymmetry in the balance or in insertions of the superior or inferior oblique muscles, and (2) secondary overaction due to paresis of the homolateral superior oblique or contralateral superior rectus muscle.

The diagnosis is best made by the cover test and in various fields.

The treatment for overaction is broken down into several types: (1) tenotomy at source of the muscle, (2) tenotomy at insertion of the muscle, (3) recession at insertion of the muscle, and (4) altered insertion of the horizontal rectus muscles.

Weakness of the inferior oblique muscle is then considered and treatment is outlined as follows: (1) strengthening of the affected muscle by advancement at its bony origin, (2) making a tuck or resection at the insertion of the muscle, (3) weakening of the contralateral yoke muscle, and (4) weakening of the homolateral antagonist muscle.

Large horizontal errors must be corrected before the vertical defects are attacked.

Accurate diagnosis is necessary for satisfactory treatment. EARL H. MERZ, M.D.

Osteoma Involving the Orbit. FRANK W. NEWELL. *Am. J. Ophth.*, 1948, 31: 1281.

The author discusses osteoma involving the orbit. An osteoma frequently originates in the nasal accessory sinuses and may invade the orbit (resulting in ocular disability) before localizing signs appear in the sinus.

Ocular involvement occurs most frequently when the original growth is in the sphenoid or in the ethmoid sinus, less commonly when in the frontal, and rarely when in the maxillary sinus.

Osteomas are hard, glistening, rounded tumors which present numerous facets that follow the outlines of the sinuses and other structures against which they impinge during growth. They may be sessile or pedunculated. They may be quiescent for long periods of time or become very large without symptoms. The tumors are covered with normal periosteum which extends into the substance of the growths. There are 3 main classes of true osteomas: the eburnated (ivory hard), the compact (resembling normal bone), and the spongiose (the most immature type).

Osteomas should be distinguished from bony hyperplasia of the bones of the skull which occurs as hyperostosis in dural endothelioma. In the latter the marrow spaces of the bone are filled with tumor cells, the invasion of which causes the bony overgrowth.

The symptoms and signs of osteoma are cerebral, nasal, and ocular and they depend upon the site of origin. Cerebral disturbances include mental de-

ficiency, vertigo, various sensorimotor disturbances, convulsions, cerebral pneumatocele, and increased intracranial pressure.

Intracranial difficulties are usually produced by sphenoidal growths. Occlusion of a sinus (with resultant infection) usually occurs with tumors of the frontal sinus. Anosmia indicates cerebral extension with involvement of the olfactory nerve.

Ocular signs are usually associated with ethmoidal and sphenoidal tumors. Extension into the orbit usually results in progressive exophthalmos. Sphenoidal osteomas may affect the optic nerve and result in optic atrophy, papillitis, or papilledema. An ethmoidal tumor may produce papillitis, generally attributed to involvement of the blood supply to the optic nerve.

The diagnosis is based on roentgenographic evidence of a well circumscribed bony tumor originating in a sinus and the absence of increased thickness of other bones of the skull. Diagnosis of osteoma of the frontal or maxillary sinus is simple; diagnosis of a sphenoidal tumor rests on microscopic study of the tumor because a dural endothelioma may produce a similar picture. This also applies to tumors originating in the ethmoid sinus, although a localized, bony tumor at this site without hyperostosis of the roof of the orbit or sphenoid ridge is most likely an osteoma. Moreover, dural endotheliomas occur after, while benign osteomas frequently occur before the age of 30 years.

Seven cases are presented; in 2 of them the tumors originated in the ethmoidal sinus, in 1 in the sphenoid body, and in 4 in the frontal sinus. The tumors arising from the ethmoid were successfully removed; the tumor arising from the sphenoid was considered inoperable. Death resulted from internal hydrocephalus. JOSHUA ZUCKERMAN, M.D.

The Present Position of the Problem of the Intraocular Fluid and Pressure. SIR STEWART DUKE-ELDER and H. DAVSON. *Brit. J. Ophth.*, 1948, 32: 555.

The authors discuss the nature of the aqueous humor and the present position of the problem of the intraocular fluid and pressure. It appears that the intraocular fluid is more than a simple dialysate in equilibrium with the capillary plasma. This is confirmed by a study of nitrogenous substances: urea penetrates more slowly than glucose although it has much the smaller molecule. The chemical composition of a substance is more important as a determinant of rate of penetration of the barrier than is its molecular size. Whatever cellular activity is present is localized in the lining epithelium of the eye, mainly in the ciliary region.

The actual mechanism is more complicated than dialysis, it differentiates between substances on a chemical basis, and the blood aqueous barrier differs in different localities of the eyeball. In the case of sugars, entrance into the anterior chamber through the iris is easy; entrance into the vitreous is slower. Certain substances, e.g., sodium and potassium enter the vitreous from all parts of its periphery by way of the choroidal and retinal circulations. This finding reveals the analogy between the capillaries of the cerebral and those of the retinal vascular systems.

Although the simple dialysis theory appears to be wrong, the fairly close similarities in chemical composition of aqueous humor and plasma indicates that the simple physical factors of diffusion and osmosis are operative. Some degree of unidirectional permeability and the capacity for maintaining concentration gradients exist. The energy necessary for such modifications depends upon a difference of potential between the ciliary stroma and epithelium by oxidative and reductive processes due to the presence of the respiratory enzyme in the latter. This activity of the ciliary epithelium, as a result of the excess of pressure results in a driving pressure of fluid into the eye. Fluid is forced into the eye with a pressure-head of from 50 to 75 mm. Hg. Because there is no counterpressure the intraocular pressure must equal this driving pressure unless there is a leakage of fluid out of the eye.

An alternative theory is the following: the aqueous may be elaborated entirely within the cells of the ciliary epithelium and possibly in other cellular linings of the eye. The fluid is extruded into the posterior chamber as a "primary aqueous humor." If completely developed the aqueous would appear to be a simple dialysate in spite of its secretory origin. However, the aqueous humor does not remain in the eye long enough for this diffusion equilibrium to be established but an intermediate state is achieved. In this state it has strong characteristics of a dialysate betraying its secretory origin, namely, an osmotic pressure greater than that of the plasma, a higher concentration of sodium and chloride than required of a dialysate, a low concentration of urea, and a high concentration of ascorbic acid.

It is concluded that in the present state of our knowledge no final conclusion can be reached. More extensive and detailed experimental work is necessary. JOSHUA ZUCKERMAN, M.D.

A Contribution to the Microscopical Anatomy of the Sympathizing Eye. R. AFFLECK GREEVES. *Brit. J. Ophth.*, 1948, 32: 545.

The author describes the microscopic anatomy of the sympathizing eye. He points out that the character of the histologic changes is not identical in exciting and in sympathetic eyes.

He presents 13 sympathizing eyes in all of which the original perforating injury to the exciting eye was an intraocular operation. He found that the character and distribution of the inflammatory changes in the various parts of the sympathizing eyes are not related to the duration of the disease. Neither is there any relationship between the length of time elapsing between the injury to the exciting eye and the onset of inflammation in the sympathizing eye.

In 7 cases the infiltrating inflammatory cells were lymphocytes and plasma cells, in 6 cases there were

epithelioid cells, and in 3 of the latter there were giant cells.

Iridocyclitis was the constant common factor in all cases. The choroid was found to be normal in 5 cases, while in 6 cases there were areas of infiltration consisting of lymphocytes and plasma cells only. Epithelioid cells occurred in the choroid in 2 cases and giant cells in only 1 case. The areas of choroidal infiltration consisted of localized patches in the outer layers of the choroid; the capillary layer was free except in one case in which the whole thickness of the choroid was involved. The posterior section of the choroid immediately surrounding the optic disc was consistently the most densely infiltrated part. Both findings are in accordance with the conditions usually found in exciting eyes. These are salient characteristics of sympathetic diseases.

In most cases there were some inflammatory cells in the vitreous. The optic nerve was normal in 5 cases and edematous in 8 in which the sheaths of the central vessels showed lymphocytic infiltration. The sheath of the optic nerve was infiltrated in 1 case only and the sheaths of the ciliary vessels were infiltrated in 4 cases.

Spontaneous rupture of the lens was found in 3 cases. Organized plastic exudate in the anterior chamber occurred in 3 cases. In none of the cases did the infiltration in the iris reveal any particular tendency to be situated in the posterior layers, and there were no Fuchs-Dalen bodies.

Greeves concludes that on microscopic examination no special characteristic of the sympathetic inflammatory process is found invariably in the sympathizing eye. JOSHUA ZUCKERMAN, M.D.

EAR

The Development of the Auditory Ossicles, the Otic Capsule, and the Extracapsular Tissues. BARRY J. ANSON, THEODORE H. BAST, and EARL W. CAULDWELL. *Ann. Otol. Rhinol.*, 1948, 57: 603.

Concurrent steps in the morphogenesis of the ossicles, otic capsule, and pericapsular portions of the temporal bone were studied in serial sections of 300 temporal bones.

In the otic capsule, the first of 14 ossification centers appears early in the fourth lunar month (120 mm. C.R.). These centers fuse to form a complete capsule prior to the middle of intrauterine life (155 mm.). Thus, adult dimensions of the capsule are attained at approximately the same time the stapes attains full size. Growth is precluded by the fusion of the numerous centers of ossification, between which there occur no zones for epiphyseal expansion. However, the otic capsule is not yet histologically mature nor is it embedded in the extracapsular osseous tissue which lends typical form to the so-called petrous portion of the temporal bone.

Of the three layers of the capsule, the inner, or endosteal, stratum is the simplest. It forms a mere shell for the labyrinthic canals, cochlea, and vestibule; it is complete at midterm and undergoes no further increase in size.

The outer, periosteal layer appears in the cochlear region of the capsule during the eighteenth week (147 mm.), and is complete before the eighth month (246 mm.). In the canalicular part of the capsule it appears later (183 mm.), and spreads beyond the limits of the original capsule, toward the mastoid region; it continues to expand, as an extracapsular addition, until puberty.

Of the three layers, the middle (intrachondrial and endochondral tissues combined) is the most complex in structure. In both cochlear and canalicular divisions of the capsule intrachondrial bone appears in the 147 mm. fetus; this immature osseous tissue attains maximum distribution within a period of about 6 weeks after primary appearance (in the 215 mm. fetus). Around the cochlea intrachondrial bone retains fundamental form up to the 246 mm. stage. Thereupon the formation of endochondral bone is initiated as a thin deposit over the islands of intrachondrial tissue, without other alteration of the "spicules" upon which deposition of the replacement bone takes place. At term the process is suddenly accelerated, continuing through early infancy with such alacrity that the cochlear region resembles closely that of an adult bone. In the region of the canals there is no such initial lag in development. The deposition of endochondral bone around the canals is rapid up to the stage of 7 or 8 months (270 mm.), with subsequent slow deceleration. Activity begins in the region of the superior semicircular canal, followed by the posterior and lateral canals; the intervening tissue is the last to be formed in endochondral bone.

The intercanalicular area never becomes converted into bone of fully petrous character. It retains marrow spaces which may persist in the adult ear, or may be replaced, beginning in the seventh month (246 mm. stage), by pneumatic spaces which spread from the tympanic antrum. When such occur, invasion by mucous membrane progresses so rapidly as to be complete in the young child (3 years old). Except for this portion of the capsule, pneumatization is restricted to bone of periosteal nature which was added peripherally to the primordial osseous capsule. In other words, except in the territory named, the process of mucosal invasion leaves untouched that portion of the capsule which existed in the midterm fetus.

In the interval between periosteal and endosteal layers, where marrow might be expected to occur, such tissue is usually replaced by bone of endochondral character, thereby rendering the capsule relatively solid, or petrous. The interstices are subsequently invested by mucous membrane derived from the tympanic cavity. Concurrently, periosteal bone, added to the capsule in the latter half of fetal life, is similarly invaded to form the air cells of the apical and related portions of the temporal bone.

After branchial inception of the auditory ossicles, cartilaginous growth occurs rapidly. At 28 mm. the

incus is separating from the malleus, and the stapes has become independent of Reichert's cartilage. Single ossification centers first occur in the incus at 117 mm., in the malleus at 126 mm., and in the stapes at 146 mm. Endochondral ossification proceeds rapidly in the malleus and incus with none of the remoulding of contour observed so dramatically in the stapes.

The ossicles form without epiphyseal areas of growth, and therefore do not increase in size after bone becomes continuous around their peripheries. During ossification the stapes becomes hollowed at the capital and basal extremities, and channelled throughout the entire length of each crus. Vascular marrow gradually retreats before the advance of the tympanic mucous membrane. Endochondral bone persists only on the internal aspect of the head and base, forming a thin plate lining the "articular" cartilages. The ossicles attain full dimensions near the middle of intrauterine life and possess adult form by the thirty-second week, or 290-mm. stage.

EARL W. CAULDWELL, M.D.

An Experimental Study of the Toxic Effects of Streptomycin on the Vestibular Apparatus of the Cat. The Central Nervous System. JULES WINSTON, F. H. LEWEY, ANDRÉ PARENTEAU, PHILIP A. MARDEN, and FAITH B. CRAMER. *Ann. Otol. Rhinol.*, 1948, 57: 738.

A destructive effect upon the vestibular function is the most important toxic reaction of prolonged therapy with streptomycin. Various authorities mentioned in this article disagree as to whether the lesion causing this effect is located in the central vestibular nuclei in the brain stem, in the peripheral vestibular end-organ, or in both of these places. The author has carried out three entirely different methods of investigation on cats whose vestibular apparatus had been destroyed by toxic doses of streptomycin, and each of these methods has disclosed evidence of central damage. He is now engaged in investigating whether there is concomitant damage to the peripheral end-organ. All of the experiments appear to be adequately controlled.

The first experiment is based upon the fact that damaged but not normal brain cells have an affinity for a stain (trypan blue) when injected intravitally into the carotid artery. In this experiment the control cats showed no staining of any of the tissues of the central nervous system. The cats whose vestibular apparatus had been destroyed by streptomycin showed staining Purkinje cells of the cerebellar cortex, dentate, and fastigial nuclei, and the medial and lateral vestibular nuclei. A slight amount of dye was found in the ventral cochlear nuclei.

The second experiment is founded upon the fact that surgical destruction of the right vestibular nuclei will result in an uncompensated nystagmus to the left. Additional surgical destruction of the right vestibular nuclei, but not of the right vestibular peripheral apparatus, will completely and permanently eliminate this nystagmus. After surgical destruction of the right vestibular nuclei all control cats developed nystagmus to the left, but all cats that had been treated with streptomycin did not develop nystagmus. This experiment definitely limits the destructive effect of streptomycin to a solitary destruction in the vestibular nuclei or possibly destruction to both the vestibular nuclei and the vestibular end-organs.

The third method of investigation consists of the examination of brain sections stained with phosphotungstic acid and cresyl violet. The controls showed no pathologic changes. Animals treated with streptomycin showed pyknosis and increase of glial fibers around the dendrites of the Purkinje cells of the cerebellum in 4 out of 6 animals. There was no destruction in the other 2. The temporal bones of these animals are now being examined to determine the presence of lesions in the peripheral end-organs.

WILLIAM K. WRIGHT, M.D.

NOSE AND SINUSES

Rhinoscleroma Apparently Cured with Streptomycin. GORDON B. NEW, LYLE A. WEED, DONALD R. NICHOLS, and KENNETH D. DEVINE. *Ann. Otol. Rhinol.*, 1948, 57: 412.

Rhinoscleroma is a chronic granulomatous process involving the nose, upper lip, mouth, and upper air passages. It is believed by many to be an infection but it is only slightly, if at all, contagious. An organism of the genus Klebsiella may usually be isolated from such patients. The chronic progressive clinical disease of rhinoscleroma has not been reproduced in animals but the organisms are always present in the tissue of patients with this clinical manifestation. The organisms are usually seen in the large phagocytes and are easily grown in an artificial culture medium. Organisms with similar cultural features are frequently isolated from the respiratory tract of normal persons.

The disease was once thought to exist only in central and southeastern Europe, but it now occurs anywhere, and its incidence in South and Central America seems to be increasing. According to Cunning and Guerry, a total of 102 cases had been reported in the United States and Canada by 1942; 16 of the patients were native-born.

Clinically, there is at first an insidious growth of hard, smooth nodules in the anterior nares. This growth spreads gradually until, in many cases, protruding, rounded, smooth masses with intact skin surfaces close the nostrils. From the anterior part of the nose the lesion spreads backward into the pharynx, larynx, and trachea, and even into the bronchi. It may extend forward onto the upper lip or involve the cheeks, gums, antrum, lacrimal ducts, soft and hard palates, and tonsils. Because of the presence of these masses function is impaired, and such symptoms as foul nasal discharge, nasal obstruction, deafness, tinnitus, hoarseness, and difficult breathing may ensue. Tracheotomy is often necessary. The disease is limited to the mucous

membrane and skin, ulceration is the exception and not the rule, and constitutional symptoms are rare.

Up to the present no satisfactory method of treatment has been available. Therapy with roentgen rays or radium is, at best, palliative and must be repeated as recurrence of the disease dictates. Sulfanilamide and its derivatives seem to control the secondary infection, but have no effect on the scleromatous tissue.

Recently a patient with rhinoscleroma was treated at the Mayo Clinic with streptomycin.

This patient with rhinoscleroma is the first to be reported as probably cured with streptomycin, as far as the authors know. At the time of the original examination, since the airway was partially obstructed, it was thought that tracheotomy would be necessary; as much of the granulomatous and scar tissue in the larynx and trachea as possible would then be removed and replaced with a skin graft, and later with an obturator in order to maintain an opening. The use of streptomycin cleared up the granulomas and also eliminated Klebsiella from tissue taken subsequently for biopsy. This evidence adds to the general impression that Klebsiella is an etiologic factor in the disease.

NECK

Clinical and Experimental Research on Thyroinhibitory Substances. The Employment of Sulfa Derivatives in the Continuous Medical Treatment of Hyperthyroidism (Ricerche cliniche e sperimentali sulle sostanze tireoinibitrici. L'impiego dei solfoderivati nel trattamento medico continuativo dell' ipertiroidismo.) LUIGI PARODI and MARIO DE GREGORI. *Arch. ital. chir.*, 1948, 70: 269.

The major portion of this article consists of a detailed review of the history, clinical application, influence on the symptoms of hyperthyroidism, contraindications, toxic manifestations, late results, and methods of action of thyroinhibitory drugs, as gleaned from the literature.

The authors then present their own experiences with 31 patients who varied from 20 to 60 years in age and who were classified as follows: 22 with Flajani-Basedow's disease, 4 with hyperthyroidism, and 5 with secondary thyrotoxicosis. The condition in 12 patients was considered grave and in 9, moderately grave when first seen. Most of the patients had received iodine therapy previously. Before treatment was begun, the subjects had a complete blood count, basal metabolism test, and blood chemistry tests for sugar, urea, and cholesterol. Aminothiazole was used in 5 cases and methylthiouracil in the remainder. While therapeutic doses were being given, the complete blood count was repeated weekly and the other laboratory tests were made every 2 weeks; these determinations were made less frequently during the period of maintenance. Electrocardiograms were taken only of patients who presented thyrocardiac symptoms. Eleven of the patients were hospitalized. At the time of writing, 16 patients had finished with a complete course of treatment and the medication had been stopped for from 2 to 12 months. The results were considered to be very good in 5, good in 4, and mediocre in 2; 5 patients had a recurrence of hyperthyroidism. One-third of the total number of patients developed toxic manifestations, including arthralgia, nausea and vomiting, exanthemas, fever, and subicterus. There was only 1 instance, however, wherein the drug had to be stopped. This was for severe leucopenia. Three patients who did not respond well to medical therapy were also treated by irradiation of the hypophysis, with 900 roentgens divided into 6 weekly doses. All 3 responded well thereafter. The essential data for all 31 cases are clearly presented in table form.

In general, the authors conclude that:

1. Methylthiouracil and aminothiazole have demonstrated a specific curative effect against a large portion of the morbid components of Basedow's disease, particularly in respect to neuropsychic and cardiovascular symptoms and weight loss.

2. These drugs have little or no effect on exophthalmos nor on the final size of the thyroid gland.

3. There are wide individual variations in the therapeutic response to these drugs, but there is no relation between these various responses and the type, duration, or gravity of the disease, or the age or sex of the subject.

4. Methylthiouracil has a more potent therapeutic action and is more likely to result in toxic manifestations than aminothiazole.

5. Irradiation of the hypophysis is a valuable adjunct in some subjects who demonstrate a poor therapeutic response to the drug alone.

As a final definitive treatment for hyperthyroidism as compared to thyroidectomy, these drugs have been used in too few cases by the authors and the patients treated have not been followed up long enough to make a decision in favor of medical treatment. However, the authors state that this form of therapy is usually not indicated in toxic adenomas of the thyroid. N. CHRISTIAN MEYER, M.D.

The Association of Carcinoma of the Thyroid Gland and Exophthalmic Goiter. JOHN DEJ. PEMBERTON and B. MARDEN BLACK. *Surg. Clin. N. America*, 1948, 28: 935.

Carcinoma of the thyroid gland occurs occasionally in association with exophthalmic goiter. In a series of cases of carcinoma of the thyroid gland collected from the literature, 1.75 per cent of the malignant lesions were associated with exophthalmic goiter. At the Mayo Clinic, 0.4 per cent of thyroid glands removed because of exophthalmic goiter from 1936 through 1946 contained coincident carcinomas. A total of 22 such cases have been encountered at the clinic. In 15 of the cases the malignant lesions had evidently not originated in an adenoma, while in 7 cases the carcinomas had developed in adenomas. The great preponderance of low grade, slowly growing carcinoma in the series, and the fact that in only 1 of the 22 patients had the carcinoma produced

symptoms, suggests that the malignant lesions could well have developed before the onset of the exophthalmic goiter in most cases. At least this explanation of the preponderance of low grade lesions seems more acceptable than the belief that the hyperplastic or hypertrophic cells give origin almost exclusively to papillary malignant lesions. The finding of a carcinoma in the thyroid gland of a patient who has received goitrogenic drugs or radioiodine does not imply an etiologic relationship between the drug and the malignant lesion.

Hemorrhage in Deep Infections of the Neck: A Review, with Report of 2 Cases. MAURICE D. GRANT and GOODLATTE B. GILMORE. *Arch. Otolar.*, Chic., 1948, 47: 446.

The authors review the etiology and the anatomy of deep infections of the neck. They call attention to the fact that the layers of deep cervical fascia define certain potential spaces which become actual pockets when they are distended with pus. One such area is in the floor of the mouth; a second is deep to the submaxillary and the parotid glands; a third is found in the retropharyngeal area; and a fourth is seen along the carotid sheath. It is in the carotid sheath that the danger of hemorrhage is important. The vessel most commonly affected is the internal carotid artery. Although it was not proved in the authors' 2 cases that this vessel was the source of the fatal hemorrhage, it was presumed to be.

To avoid the possibility of hemorrhage, the authors feel that all of the infections in the neck should be incised early. The methods usually used for this drainage, as suggested by Mosher and by Beck, are briefly described. Should hemorrhage occur before the infection has been adequately drained, a ligation of the common carotid artery is advisable. If time permits, a test of the effect of this ligation, as suggested by Matas, may be worth while. This consists in the compression of the common carotid artery for 10 minutes, and observation of the patient for any sensations and reactions of cerebral anemia. This is usually worthy of trial, as the first hemorrhage is rarely the fatal one, and some time elapses between the hemorrhages.

The 2 cases reported occurred in children aged 4 and 7½ years. The first child was admitted with a history of hemorrhage, but without any evidence of active bleeding. He improved rapidly after transfusion, but on the following day suffered a fatal hemorrhage. The second child was admitted with a similar history. A ligation of the external carotid artery was carried out. A ligature was placed around the common carotid artery but not tied. After 4 days the ligature was removed. A few hours later the child suffered a fatal hemorrhage.

WILLIAM C. BECK, M.D.

Traumatic Lesions of the Larynx. MERCER G. LYNCH. *Arch. Otolar.*, Chic., 1948, 47: 413.

The traumatic lesions of the larynx, while not frequent, are the cause of a high rate of mortality and long disability in both military and civilian injuries. The therapy resolves into three stages: the first aid and emergency treatment, the plastic repair stage, and the stage of rehabilitation.

In the first stage, the control of hemorrhage, the establishment of a dry airway, and the control of shock are the keynotes. In the control of hemorrhage and in the establishment of an airway, the author points out two pitfalls: The wound should be débrided only of those structures whose vitality is unquestionably impaired, and every effort should be made to preserve as much tissue as possible. The second pitfall is the avoidance of a high tracheotomy. The tracheotomy should be performed as low as possible.

In the stage of the plastic repair, a careful analysis of the situation is imperative. The author feels that only by means of direct suspension laryngoscopy is he able to carefully study the structures and plan his procedure. A low tracheotomy should be performed if it has not already been done. Various procedures are described for the re-establishment of a wide patent larynx, as well as those which are indicated in concomitant esophageal injuries and fistulas. Dilatation with tantalum molds is recommended. Loss of part of the thyroid or cricoid cartilages will require grafts from the costal cage.

Rehabilitation, with speech training, is most important. Work of this nature is highly specialized and schools for this purpose have proved their value.

In the discussion, G. E. Martin (Edinburgh, Scotland) and Henry B. Orton (Newark, New Jersey) point out the relationship between the development of carcinoma of the larynx and old traumatic lesions of the larynx, and cite several cases which they have observed.

WILLIAM C. BECK, M.D.

Laryngeal Tuberculosis. Observations Based on an Experience of 28 Years with Laryngeal Tuberculosis. EDWARD ANDERSON LOOPER and I. B. LYON. *Ann. Otol. Rhinol.*, 1948, 57: 754.

Laryngeal tuberculosis is the most common chronic disease of the larynx. In the authors' experience, the occurrence of this complication of pulmonary tuberculosis is decreasing. Among 2,770 patients examined, tuberculous involvement of the larynx was found in 214, or 7.7 per cent of the patients. A survey made by the authors (20 years ago) covering a 5 year period showed an incidence of 15.5 per cent.

The decreased incidence is attributed to improvement in the care of patients with pulmonary acid-fast infections. Pulmonary collapse has decreased the chances of infected sputum being brought up and deposited on the laryngeal mucosa to cause contact invasion of the tubercle bacillus. Infected sputum is the most common cause of this illness, but organisms may enter by way of the lymph and blood streams.

A thorough examination of the larynx should be made in all cases of tuberculosis as soon as the pulmonary lesion has been diagnosed. Slight congestion, dryness, and tickling sensations of the larynx

should receive prompt attention, as such symptoms often indicate early invasion of the larynx.

In the authors' experience, cautery of the lesions, combined with general care of the patient and the removal of foci of chronic infection, has given the best results. Vocal rest is considered most important, and patients were given writing pads for their requests. Cauterization was done under local anesthesia by the indirect method at about monthly intervals.

Elevations of temperature to high degrees, marked asthenia, and high blood pressure were contraindications for the use of electrocautery.

The article is accompanied by 5 informative tables summarizing the authors' experience with this illness.

EDMUND R. DONOGHUE, M.D.

The Treatment of Laryngeal Papillomas in Childhood. H. ZALIN. *J. Lar. Otol.*, Lond., 1948, 62: 621.

Papillomatosis of the larynx occurring in infancy and childhood is uncommon; it is observed more frequently in boys between the ages of 18 months and 4 years; it is not familial, although 20 per cent of all cases are congenital. There is evidence that a filterable virus is the causative factor. Papillomas in children are not single and are not confined usually to the vocal cords, as in adults, but are multiple, and may occur all over the periglottal zone and recur rapidly following removal, but become quiescent with the onset of puberty.

The presenting symptoms are hoarseness and laryngeal dyspnea, and treatment is difficult and tedious as there is a high mortality from respiratory complications. Treatment is aimed at clearance of the laryngeal thoroughfare with the avoidance of local injury and subsequent dysphonia or laryngeal stenosis. Tracheotomy may be a lifesaving measure.

New and Erich prefer to treat laryngeal papillomas with diathermy. Chevalier Jackson advises avulsion of the tumors by surgical means, to be repeated when necessary. He feels that radiation injures the larynx unnecessarily.

The fact that gonococcal vaginitis, intractable in children, ceases at puberty, presented an obvious analogy to the problem of childhood papillomatosis of the larynx. Broyles described the treatment of 5 patients at the Johns Hopkins Hospital, Baltimore, with the weekly application of 0.1 c.c. of 10,000 units of estrogen per cubic centimeter of oil to the larynx. All 5 cases, 4 of which required previous tracheotomy, cleared up within a period of 6 months.

The author describes success in swabbing the laryngeal area with 1 c.c. of dimenformon, 10,000 units per cubic centimeter in oil, once weekly for 5 successive weeks or more in 3 different cases. The results were excellent. The rationale of this treatment is that estrogenic substance will produce a temporarily adult epithelium which is immune to infection in this disease, possibly a filterable virus.

ERNEST D. BLOOMENTHAL, M.D.

Report of Postoperative Course of Subperichondral Total Laryngectomies. EDWARD M. WALZL and EDWIN N. BROYLES. *Ann. Otol. Rhinol.*, 1948, 57: 686.

The authors' modification of the Crowe-Broyles technique for total laryngectomy for selected cases of cancer of the larynx is described. Their modification varies from the original operation, in that the base of the epiglottis is left attached to the tongue during most of the operation. They believe that this maneuver gives a better view of the pharynx, and the mucous membrane on the dorsal surface of the epiglottis can be utilized later in closing the pharyngeal defect. After the larynx has been removed the mucous membrane on the epiglottis is incised and elevated, and then the epiglottis is removed. The mucous membrane from the posterior cricoid is then sutured to the mucous membrane which was raised from the epiglottis and anchored to the connective tissue in the upper angle of the wound. The remaining defects in the pharynx are closed with inverting sutures.

The authors also report an absence of wound infection in all cases in which the wounds were irrigated with tyrothricin solution at the time of operation. With this and systemic penicillin, they feel there need be no fear of wound infection from the mouth, as none of their patients so treated became infected.

The periods of hospitalization were relatively short, ranging from 8 to 13 days.

The postoperative course of the last 27 consecutive cases is reported. No deaths occurred in this series.

EDMUND R. DONOGHUE, M.D.

SURGERY OF THE NERVOUS SYSTEM

BRAIN AND ITS COVERINGS; CRANIAL NERVES

The Surgical Pathology of Brain Abscess. GEORGE SWINBURNE. *Med. J. Australia*, 1948, 2: 169.

The author presents a detailed and complete study of the formation, development, clinical types, regional pathology, bacteriology, and histopathology of brain abscesses.

The majority of brain abscesses arise from an extension of some inflammatory focus in the ear or nasal accessory sinuses; a smaller percentage follow penetrating injuries to the skull. Metastatic abscesses from another localized abscess, or a systemic infection such as endocarditis or furunculosis are less common. Rarer still are abscesses following orbital or buccal infections.

Infection may travel from an external focus outside the skull through the bone and meninges by direct extension or by natural anatomical channels. However, it is anatomically impossible for infection to reach the brain by way of the general somatic lymphatic system. Infection by direct extension may result from erosion of the bone, followed by necrosis of the dura. The dura itself is resistant to a spreading infection, and progress of the infection is delayed temporarily. Usually an extradural abscess forms, which produces an inflammatory reaction of the arachnoid and the pia mater and causes their adhesion to the dura, sealing the process off. The underlying cortex may undergo an ulcerative process. A subdural abscess may form, or a generalized leptomeningitis may occur.

In the case of direct trauma, the infection may result from direct implantation in the cerebral tissue, from osteomyelitis, or from scalp infection.

Infection may penetrate the brain and the blood vessels, by the intravascular or perivascular route; perivascular spread usually occurs after the infection has reached the subarachnoid space. The perivascular infiltration of predominantly mononuclear cells into a sulcus is accompanied by cerebral edema and the formation of numerous new capillaries in the cortex. The cortex itself is invaded by inflammatory cells radiating from the vessels, and by large numbers of endothelial cells and phagocytes. The abscess begins in the relatively avascular zone in the subcortical white matter and tends to spread towards the ventricles. It may be stopped by the central mass of white matter with its relatively good blood supply. Intravascular infection may spread by way of the veins or arteries. In the veins, it takes the form of a retrograde thrombophlebitis. After a short period, perivasculitis also occurs and the area of the brain normally drained by the thrombosed veins undergoes degeneration first in the relatively avascular subcortical zone in which the abscess later develops. The arterial spread follows the formation of an infected mural thrombus or a bacterial embolus. In this case the area of cerebral infarction becomes infected.

Nasal or aural infections may spread from the nasal or ear cavities to the subarachnoid spaces along the perineural sheaths around the olfactory, auditory, or facial nerves. Two vestibular channels may be differentiated: the aqueduct of the cochlea, and the aqueduct of the vestibule. The latter is probably the commonest route of infection—from the labyrinth to the cerebellum. Erosion of the bony wall of the aqueduct, or empyema of the saccus with spread along the endolymphatic duct may occur. Infection from the mouth through a persistent craniopharyngeal canal, or from the ear through the hiatus subarcuatus, or a persistent petrosquamous suture is of rare occurrence.

In the cerebrum, the cortex offers considerable resistance to infection because of its good blood supply. Infection spreads from the relatively avascular subcortical white matter fairly rapidly in a direction parallel with the course of the blood vessels, and is caused by tissue destruction which occurs as a result of thrombosis of the vessels around the edge of the abscess. The abscess may drain along its stalk and its pathway of entrance, or it may perforate into the ventricles, or leak into the subarachnoid space. In the cerebellum, extension of the infection occurs in the white matter of one lobule and compresses the surrounding area. Edema and inflammation take place in the more resistant cortex.

Clinically the cerebral and cerebellar abscesses may be classified as adjacent if they occur in the immediate neighborhood of a focus of infection (otogenous, rhinogenous, osteomyelitic and traumatic), and nonadjacent, or metastatic. The former are usually single and are situated in the frontal or temporal lobes, or in the cerebellum; the latter often are multiple and occur in the course of an overwhelming generalized septic process, or (more commonly) secondary to subacute pulmonary infection, or infections of the urinary tract.

Temporal lobe abscesses are secondary to aural infections. The infection spreads from the roof of the attic or mastoid antrum into the middle fossa and the inferior surface of the temporal lobe. Frontal lobe abscesses are secondary to frontal or ethmoid sinus infections. They often grow to a large size with a thick wall before manifesting any symptoms. Abscesses of the parietal and occipital lobes are uncommon and usually of pyemic origin. They may follow a retrograde thrombophlebitis from a thrombosed lateral sinus or a local osteomyelitis. Adjacent abscesses of the cerebellum are usually of aural origin and are found in the posterior-inferior or posterior-superior lobules.

The cerebrospinal fluid in brain abscesses contains a large number of polymorphonuclear cells during

the period of meningitis, and a greater number of lymphocytes during the period of localized encephalitis and early abscess formation. A chloride content below 700 mgm. per cent indicates generalized leptomeningitis. When the abscess is encapsulated the fluid chloride content is normal. An increase in total protein and globulin, which is always present, is not diagnostic.

Streptococci are the most common organisms found in brain abscesses. Pneumococci, not infrequently mixed with staphylococci, are less common. Occasionally Bacillus proteus, coli, and anaerobic organisms may be found. Streptococcus viridans has also been observed. Anaerobic bacteria do not favor the formation of an abscess capsule.

The author also reviews the histopathological evolution of a brain abscess and describes the phases classified by Carmichael, Kernohan, and Adson as (1) focal necrosis and microgliosis, (2) primary delimitation and fibrosis, (3) secondary delimitation and astrogliosis, and (4) repair and vascularization. These stages merge gradually into each other and have no particular relationship to the chronological and symptomatic progress of the abscess.

The whole problem of cerebral abscess, its prophylaxis, treatment, and cure has been profoundly modified by the introduction of modern methods of chemotherapy. Repeated aspiration of the abscess under chemotherapeutic control, followed by total removal when it has become stabilized, seems to be the best method of treatment. The author is also in favor of dealing with temporal lobe abscesses through a separate clean approach and not through the mastoid and ear. However, the problem of treatment of brain abscess is not as yet solved completely. GEORGE PERRET, M.D.

SPINAL CORD AND ITS COVERINGS

Cysts of the Sacral Roots. I. M. TARLOV. *J. Am. M. Ass.*, 1948, 138: 740

Cysts of the posterior sacral nerve roots seem to constitute another cause of the sciatic syndrome which may be dealt with satisfactorily at operation.

A case report is noted in detail. The history was that of a typical disc syndrome. There was a traumatic incident followed by pain in the right sciatic distribution of the thigh and leg, with distinct periods of remission and exacerbations. There were, in addition, some paresthesias in the affected extremity. Neurological examination suggested motor, sensory, and reflex changes consistent with a diagnosis of protruded nucleus pulposus at the lumbosacral joint. Routine x-ray examinations of the spine were normal, and myelography was regarded as unessential. The only equivocal finding on admission was no pain either on hyperextension or lateral flexion of the spine.

Hemilaminectomy was performed on the right at the lumbosacral joint, with no evidence of any pathological finding. A similar result was obtained on exposing the fourth and fifth lumbar interspace. A re-examination of the lumbosacral space led to the discovery of a piece of epidural fat which bulged upward. Upon tracing this further, by removal of 3 cm. of sacrum on the right, a cystic tumor 1 cm. by 2 cm. was exposed on the posterior division of the second sacral nerve root. The lesion did not connect with the subarachnoid space, and was removed by excising a portion of the posterior nerve root. The patient recovered rapidly, having only transient darting pains in her right thigh. The only positive neurological finding was the persistent absence of the right ankle jerk.

A group of cases of backache and sciatica exist, for which there is no adequate explanation. Operations for protruded intervertebral discs have been negative in 10 per cent of the cases which presented typical signs and symptoms requiring operation. In 1938, the author found 5 perineural cysts on extradural portions of the posterior sacral or coccygeal nerve roots in the course of dissecting the filum terminale in 30 cases. He believes that failure to explore the sacral region more fully may mean overlooking some of these lesions and may account for some of the negative explorations in the surgical treatment of sciatica. It is felt that myelography would not demonstrate such lesions because the cystic cavity does not communicate with the subarachnoid space, and therefore diagnosis can be made only by exploration. RICHARD C. SCHNEIDER, M.D.

Discussion on Rupture of the Intervertebral Disc in the Cervical Region. W. RUSSELL BRAIN, G. C. KNIGHT, and J. W. D. BULL. *Proc. R. Soc.M.*, Lond., 1948, 41: 509.

W. RUSSELL BRAIN. Although protrusions of the intervertebral disc are common in both the lumbar and cervical regions, the comparative anatomy reveals that the disc is relatively larger in the cervical region and contributes more to the lordotic curve. In the cervical region, the spinal cord is anchored firmly and the roots run a short course, hence, producing greater fixation of the cord and more likelihood of direct pressure. The posterior longitudinal ligament does not reach the lateral margins of the disc and is weakest in the midline. Disc protrusions are likely to occur either in the midline and cause spinal cord compression, or at the lateral margin, producing root compression. This author discusses the possibility of many of the symptoms being produced by pressure upon the veins and arteries with the secondary changes of edema or ischemia.

The discussion is based largely upon 10 surgically verified cases. Eight patients exhibited signs of spinal cord compression, while 2 had symptoms only of a radicular type. It is realized that the relative frequency of these two clinical pictures is not represented by the 10 cases. Trauma appeared to be a factor in only 2 of the patients. Osteoarthritis was present on x-ray examination in 7 of the 10, and in 1 patient there were osteoarthritic changes in the thoracic spine only. A traumatic origin was thought to be more likely in the younger patient whose con-

dition was possibly associated with a congenital weakness of the disc. Osteoarthritis was thought to be a very definite etiologic factor in the older age group. The etiology of osteoarthritis as a causative factor is obscure and may be associated with osteophytic changes. In 6 cases the disc protrusions occurred at the fifth cervical interspaces, in 2 cases at the fourth cervical interspace, and in 1 case each at the second, third, and sixth cervical interspace.

The mode of onset may be acute, with special involvement of the neck and one upper limb. This usually follows trauma which may often be very slight. An insidious onset, which may be remittent in type, may be associated with symptoms of either radicular or spinal cord compression. The most common radicular symptom is pain which is described as shooting or burning in character and corresponds to the distribution of the nerve root involved. It is usually made worse by coughing or by movements of the neck. The area of pain may be more extensive than the actual distribution of the nerve root. Sensory loss is often slight and rather patchy. Although slight muscular weakness may be present, a gross muscular wasting is unusual. Spinal cord compression usually resulted in greater damage to the pyramidal tract than to the sensory pathways. A Brown-Sequard syndrome was found in 4 cases; however, the laterality of the disc protrusion could not be made out on the clinical basis alone. Involvement of the posterior column was rare, and only 1 patient showed much damage to the spinothalamic tracts.

Examination of the cerebrospinal fluid showed some abnormality in 8 cases which were investigated by this means. This consists of evidence of a subarachnoid block (in 4 cases) or an increase in the protein content of the spinal fluid. X-ray examination revealed osteoarthritic changes in 7 of the 10 cases, and myelography yielded positive results in all 6 cases in which this procedure was carried out. Although movements of the neck are somewhat limited, particularly in cases of acute rupture, examination may be surprisingly negative in chronic cases with osteoarthritis. The diagnosis can be verified by changes in the cerebrospinal fluid and associated x-ray changes; however, in doubtful cases myelography may be necessary. Conservative treatment will often give good results, particularly in patients with radicular symptoms; hence, an operation would be necessary only in patients with persistent symptoms and with evidence of spinal cord compression.

G. C. KNIGHT. The author agrees with Stookey with regard to the three types of herniated cervical discs—root compression, hemi-cord compression, or anterior midline compression of the spinal cord. However, he points out that occasionally the symptomatology may be that of a progressive lesion changing from one phase to another. In a comparatively brief discussion he presents an excellent description of the symptomatology of the various types of compression.

Acute protrusions of the cervical disc may occur following comparatively mild injuries. These may be seen in elderly patients after a fall or even on a sudden movement of the neck. If the disc protrusion resulted only in a contusion of the spinal cord, then a substantial degree of recovery might be expected. If, however, the anterior spinal artery is occluded by a disc, then there is great likelihood that the condition will be irrecoverable.

The earliest symptom of nerve irritation is characterized by exacerbations and remissions of severe pain usually in the lower portion of the neck radiating to the shoulder and down the upper extremity in the distribution of the nerve root involved. Protrusions at the fifth or sixth cervical interspaces cause pain in the shoulder, the supraclavicular fossa, and lateral aspect of the upper arm, but rarely into the forearm or the hand. If the sixth cervical nerve is compressed, the patient will usually complain of paresthesias on the radial side of the forearm and thumb. Irritation of the seventh root will produce paresthesias on the back of the index, middle, and ring fingers and on the dorsum of the hand. In somewhat larger protrusions, the nerve root may be fixed and compressed, resulting in less pain but in more neurologic signs. A more severe compression will result in a greater degree of motor weakness and sensory loss. In rare cases the pain may radiate into the anterior pectoral region, and may sometimes be diagnosed as pseudoangina.

Compression of half of the spinal cord by a protruded disc may result in a typical Brown-Sequard syndrome. In greater degrees of involvement of the spinal cord there are usually signs of damage to the pyramidal and spinothalamic tracts. The signs and symptoms, however, may be variable and occasionally a diagnosis of subacute combined degeneration may be made.

The treatment will depend upon the type of disc protrusion. In cases of root irritation, especially in the early stages, conservative treatment is definitely advocated. Knight treated 29 patients by conservative measures and complete relief was obtained in 24 cases. A partial hemilaminectomy was required in 5 cases. In all cases showing evidence of unilateral cord compression, a laminectomy is required. In cases of bilateral cord compression there is some doubt as to the advisability of attempting to remove the disc, especially since attempts to do so may lead to an increase in neurologic signs. In such cases a decompression and section of the dentate ligaments may be all that should be done.

J. W. D. BULL. The author presents a careful qualitative study of the volume of both the lumbar and the cervical intervertebral discs. Considering that 15 per cent of the volume of the disc may be nucleus pulposus, the greatest portion of the nucleus pulposus that could be extruded would have a diameter of 0.7 cm. Usually, of course, they would be much smaller than this amount. It is pointed out that in the lower cervical region the cervical nerves extend out from the spinal canal between two joints.

The anterior joint is formed by a synovial lining between each vertebra. This small anterior joint is usually not mentioned in anatomical studies. Although the author presents diagrams revealing the various types of disc protrusions, particularly the midline posterior protrusion and the lateral protrusion, resulting in nerve root irritation, he appears to be quite skeptical that the actual protrusion would be sufficient to produce the neurologic signs presented by these patients. In verified cases of definite protrusion of the disc, the author feels that there must be some other degenerative or neoplastic process in addition.

The narrowing of the lower cervical interspaces is thought to produce irritation of the anterior synovial joint resulting in a small effusion with thickening of the tissues and compression of the nerve root. These changes may be detected by x-ray examinations, especially by oblique views of the cervical spine.

The roentgenographic examination of the patient should consist of anteroposterior, true lateral, and right and left oblique views. The frontal roentgenograms should be taken last in order to determine the direction of the ray since there is often a tilt of the lower three cervical vertebrae.

JACK I. WOOLF, M.D.

Cordotomy and Leucotomy (Chordotomie und leukotomie). U. EBBECKE. *Deut. med. Wschr.*, 1948, 73: 391.

The relief of intractable pain by cordotomy and by leucotomy is discussed in this article. Special attention is paid to the anatomical and physiological concepts which are involved in both procedures. Routine cordotomy with section of the lateral spinothalamic tract in the cervical region is described in detail, and particular emphasis is placed upon the fact that the fibers of the lower extremity tend to lie more laterally in the tract than those of the upper extremity and sacral areas. The postoperative changes in various sensory modalities are listed, but no note is made of the complications associated with injury to fibers controlling the bladder or the motor power in the lower extremities.

The theory of leucotomy is reviewed. It is believed that interruption of the thalamocortical fibers eliminates the driving force of the thalamus acting upon the frontal lobe, and that section of corticofugal or frontothalamic fibers removes the rather rigid control which the frontal lobe exerts upon the thalamus. With the interruption of the tangentially lying associated fibers there is a loss of memory of previous painful experiences. The immediate postoperative state is one of stupor, depression, and confusion, but the author believes that alleviation of most of these symptoms is to be expected along with little diminution of intelligence. The unfavorable sequelae of the procedure are discussed in more detail than those of cordotomy.

According to the author, the problem of relief of intractable pain can be approached from two points of view, "the sensory theory" with the associated treatment by cordotomy, and "the emotional theory" with its corresponding procedure of leucotomy. Throughout the article the author cites various physiological experiments on animals as the bases for his concepts regarding the underlying principles of these operations.

RICHARD C. SCHNEIDER, M.D.

PERIPHERAL NERVES

The Bridging of Large Nerve Defects (Zur Frage der Ueberbrueckung grosser Nervendefekte). B. HUMMEL. *Chirurg*, 1948, 19: 253.

The author reviews the process of nerve degeneration and regeneration and discusses various types of nerve repair including the bridging of nerve defects with foreign material and autogenous and homogeneous nerve grafts.

He proposes the bridging of large nerve defects with a cable graft obtained from the phrenic nerve. The advantages of such a graft are numerous: it is an autogenous graft, it is a motor nerve, its length and caliber are greater than that of sensory nerves, and it can be obtained easily by avulsion through a small wound. The unilateral paralysis of the diaphragm does not produce complications or disturbances in the function of a normal lung.

The author presents 2 cases in which he has used a phrenic autograft. In 1 patient he bridged a defect 10 cm. long of the right ulnar nerve with a cable made of 20 cm. of the phrenic nerve. The nerve was repaired 2 years after the injury. Although the patient had a postoperative wound infection the author reports a complete return of function of the flexor pollicis brevis and adductor pollicis muscles and partial return of function of the interossei 6 months after the operation.

In the second case he repaired (11 months after injury), a defect 8 cm. long in the right radial nerve with a cable graft obtained from 15 cm. of phrenic nerve. He drained the wound but there was also a postoperative hematoma. Beginning return of function was observed 34 days after operation, and after 3 months the patient could extend his fingers actively but he was not yet able to dorsiflex his hand.

GEORGE PERRET, M.D.

SURGERY OF THE THORAX

CHEST WALL AND BREAST

Reduction of Massive Breast Hypertrophy. H. O. BAMES. *Plast. Reconstr. Surg.*, 1948, 3: 560.

The experience gained in 25 years of mammaplastics resulted in the production of a film in sound and color with the color cinematography intended to be so exact as to leave no doubt about any phase of the surgical technique, each step being explained as encountered.

The film was well received, but the desire of the author to answer more completely some of the questions asked about the operation inspired the publication of this article.

Massive breast hypertrophy is considered a condition which is frequently encountered, and it is believed that the subject has a justified complaint and is entitled to relief, and that by radical surgery.

Two well defined procedures are in vogue. One seeks to avoid tissue necrosis by simple amputation, enough tissue being left to suggest a reasonably normal sized breast, and upon this mass the separately amputated areola and nipple are transplanted as a free graft.

The other method maintains the areola and nipple in undisturbed continuity with the glandular portion and at the same time creates a well shaped normal appearing breast.

The author discusses the physiology of the reconstructed breast from the aspect of lactogenesis. Such function exists in minimal degree or not at all in the very large breast, and surgery cannot destroy, create, or recreate it.

The disturbance of the endocrine balance is discounted by the fact that these huge hypertrophies are of fibrous tissue and fat which replace normal glandular structure.

The blood supply is discussed and the all important point stressed is that the central core of the remaining breast tissue must be left attached to the chest wall on the broadest possible pedicle of undisturbed circulation. In this connection it is important to avoid trauma in handling the remainder of the blood supply; excessive or rough handling or twisting

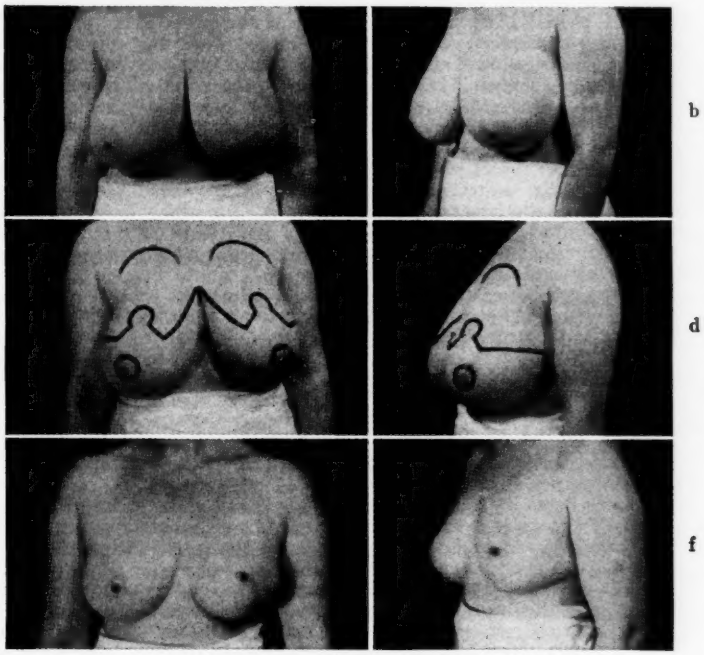


Fig. 1. (Bames) a and b, Front and profile views before operation. c and d, Front and profile views showing markings for incisions. e and f, Front and profile views after operation.

of the tissue may lead to thrombosis which can result in necrosis.

The author contends that mere reduction of size and relief of physical distress are not sufficient, but that the attempt should be made to correct psychological distress by creating a form, shape, and position with fullness and firmness of bosom desirable in the female figure. To attain this desirable result, painstaking preoperative study and planning is fundamental.

The operative, planned procedures are outlined in advance. Photographs are made for the record.

Skin markings are made to establish the pattern of the proposed changes, and are checked with the patient in different positions. Modifications of the original design are made at this time if necessary.

The two patterns which must be applied to obtain a satisfactory correction are:

1. The pattern of skin incisions which affect the shape that is to be created only from the skin fixation viewpoint.

2. The deep pattern for elimination of the excess breast tissue, the realignment of the remainder, and its fixation on the chest wall.

The marking fluid preferred is 5 per cent brilliant green in 95 per cent alcohol, and a marker is made of an applicator wound with a small amount of cotton.

The tentative design is sketched in with ordinary green ink. These markings are studied, modified, or changed until the design has been found acceptable in all positions when the permanent stain is applied.

Detailed descriptions are given of the development of the designs, illustrated by excellent explanatory drawings.

The operative procedures are discussed in detail, and the dangers inherent in careless technique and operative trauma resulting in interference with the circulation are emphasized.

The author presents the complete technique of a one-stage operation for the reduction of massive breast hypertrophy, which has been found most effective and gratifying in 25 years of experience with mammaplastics. FREDERICK W. MERRIFIELD, M.D.

Malignant Lesions of the Breast. Statistical Review with Results of Therapy (Lesões malignas da mama. Revisão estatística e resultados terapêuticos). MARIA CLEMENTINA MAIA. *Arq. pat.*, 1947, 19: 121.

This lengthy article represents a statistical study of breast cancer at the Oncological Institute of Portugal, including the cases seen between January 1, 1939 and December 31, 1942. There were 946 cases in this report; 932 occurred in women and 14 in men.

The data are condensed in table form, giving the age of the patients and the incidence, location, duration, and initial symptoms of the disease. Eighteen of the 932 women noted a discharge from the nipple as the first symptom. Nine patients had bilateral lesions.

Concerning the results of treatment, there were 186 patients who had undergone treatment prior to admission to the Institute and on whom only incomplete data were available. These cases are tabulated separately. The remaining patients, treated exclusively at the Institute, are analyzed according to the method of treatment—irradiation or surgery. These cases are broken down into the clinical groups of Steinthal and the results are tabulated accordingly. The cases treated surgically are still further broken down according to histologic type.

Three cases of Paget's disease, and the cases in males are analyzed separately. There are 46 major tables of statistics. HIRAM T. LANGSTON, M.D.

Radical Mastectomy. HEDLEY ATKINS. *Brit. J. Surg.*, 1948, 36: 87.

Since the time of Halsted, radical mastectomy has been the treatment of choice in early carcinoma of the breast. To meet better the standard criteria laid down for an adequately executed radical mastectomy, the author describes certain modifications in technique.

The skin is infiltrated with a 1 to 500,000 solution of adrenaline in normal saline, both under the incision and deep to the skin flaps over a wide area, thus rendering the dissection of the flaps nearly bloodless and defining precisely the plane of skin reflection.

The second modification consists essentially in leaving the medial skin flap to the last stage of the operation, dissecting the axilla first and securing the trunks of intercostal vessels as they emerge, thus further controlling hemorrhage. A generous area of skin is usually removed and any raw areas are covered with "postage stamp" split skin grafts. Dead space is obliterated by means of the cotton-wool "snowball," and arm movements are encouraged from the second postoperative day onward.

JESSE E. THOMPSON, M.D.

TRACHEA, LUNGS, AND PLEURA

The Syndrome of Bronchial Obstruction with Permeable Stenosis; (Filtration of Air) (El sindrome de la obstrucción bronquial con filtración aérea). RAUL F. VACCAREZZA y ALBERTO SOUBRIÉ. *An. Cátéd. pat. clin. tuberc.*, 1947, 9: 5.

Bronchial obstruction is generally considered to be of three types:

1. Partial—in which type there is a free passage of air through the stenosis, even though this be reduced in volume.

2. Valvular—in which the arrangement of the stenosis is such that air passes the stenotic area with relative ease in one direction only. The most common occurrence is for the inspiratory rush of air to be freer than the expiratory, which leads to progressive distention of the lung distal to the point of obstruction. This condition is called obstructive emphysema.

3. Complete—in which there is no passage of air past the stenosis. The present article concerns itself with an attempt to describe a functional type of

bronchial obstruction which permits the passage of sufficient air to maintain aeration of the lung parenchyma yet does not provide for significant ventilatory function of the lung.

Nine case histories are given as illustrations of this syndrome. They were all cases of pulmonary tuberculosis of rather long standing, which presented retraction of the affected hemithorax, cavernous lesions in the upper lung field, retraction of the mediastinum, and decreased radiotranslucency of the base. They were predominantly unilateral lesions. Bronchial obstruction was not visualized in the majority of cases, it being supposed that such obstructions were beyond the range of visibility.

Bronchospirometric studies revealed virtually no ventilatory or respiratory function on the affected side. The occurrence of an aerated lung (as shown by x-rays) which, however, has no ventilatory or respiratory function (as determined by bronchospirometric or oxygen saturation studies on blood) is explained by postulating a type of bronchial obstruction through which air in small amounts only may filter. HIRAM T. LANGSTON, M.D.

Ecchinococcal Disease of the Lung. Surgical Treatment (Equinococosis pulmonar. Tratamiento quirúrgico). JORGE A. TAIANA, EDUARDO SCHIEPPATTI, and RODOLFO BORAGINA. *Rev. As. méd. argent.*, 1948, 62: 441.

This well illustrated article reviews briefly the surgical management of ecchinococcal disease of lung, indicating the various procedures that have been utilized in the evolutionary history of thoracic surgery. The management proposed includes:

1. General anesthesia (cyclopropane ether given endotracheally with pentothal induction).
2. Wide exposure by thoracotomy, preferably posterolateral.
3. Adequate management of small cysts by incision and evacuation of the contained parasite, resection of the pericystic adventitial coat, suture of communicating bronchi, and closure of the lung defect. The pleura should be drained.
4. For cysts of large size, multiple cysts, or large cysts accompanied by complicating lung disease, resection of the involved lung is the treatment of choice. This is done by individual ligation technique. Whereas segmental resection may be feasible, the authors have preferred total lobectomy or pneumonectomy.

Of 29 cases of pulmonary ecchinococcal disease treated surgically, 9 were managed by resection with entirely satisfactory results and without a fatality.

Numerous roentgenograms, photographs of specimens, and 7 concise case histories amply document the article. HIRAM T. LANGSTON, M.D.

Solitary Pulmonary Abscess Treated by Primary Pulmonary Resection. JENS L. HANSEN. *Acta chir. scand.*, 1948, 97: 1.

The treatment of chronic pulmonary abscess by primary resection is advocated because of the tendency toward the formation of bronchial fistulas and cavities, and in an attempt to reduce the long postoperative period following simple pneumonectomy for chronic lung abscess.

Fourteen patients with solitary putrid pulmonary abscesses were submitted to radical operation: pneumonectomy (2), lobectomy (11), and partial lobectomy (1). Two had cavernous tuberculosis with severe putrid infection. In the remaining cases radical operation was indicated because of: (1) duration of the disease; (2) recurrence; (3) bouts of severe pneumonitis or hemoptysis, or of both, and (4) a location which made pneumonectomy impractical (subscapular, supra-axillary, interlobar, mediastinal).

One patient died in the immediate postoperative course of cor pulmonale. The condition in the 2 tuberculous patients improved considerably for the first several months after operation, but death occurred 1 year later. The remaining 11 patients recovered and were able to return to work earlier than would have been possible following pneumonectomy.

Radical operation is considered inadvisable in acute stages of pulmonary abscess.

C. FREDERICK KITTLE, M.D.

Streptomycin in Surgical Infections. Lung Abscess and Empyema. EDWIN J. PULASKI and THOMAS T. WHITE. *Ann. Surg.*, 1948, 128: 312.

Seventeen cases of lung abscess, nontuberculous empyema, and tuberculous empyema were treated with streptomycin. In 2 of 3 cases of lung abscess, improvement which could possibly be attributed to streptomycin was noted. Five patients with nontuberculous empyema were benefited by the use of streptomycin. However, 1 patient presented no improvement until adequate surgery was combined with the antibiotic. Streptomycin was tested in 9 cases of tuberculous empyema. Three of the 9 patients were treated by medical measures only, with no sign of improvement. It is clear that streptomycin is of no value in chronic productive tuberculosis. Bronchopleural fistulas and empyema of tuberculous origin will not show improvement following streptomycin therapy if the parenchymal lesions show no improvement. In 1 of 2 patients treated by closed tube drainage and streptomycin, the condition became worse, while in the other it showed improvement only after penicillin was added to the therapy. Streptomycin was used as an adjuvant to extensive surgery in the treatment of 4 patients, with definite benefit.

Streptomycin may suppress the pyogenic organisms in a mixed tuberculous empyema and permit the case to be managed as a purely tuberculous empyema. However, it may be of advantage to add penicillin to the regimen to secure maximal benefits. Streptomycin appears to afford protection during extensive maneuvers in open mixed tuberculous empyema and is extending the scope of surgery by permitting a direct attack upon the visceral fibroplastic membrane. JESSE E. THOMPSON, M.D.

Bronchial Adenoma. CARLTON R. SOUDERS and J. W. KINGSLEY, JR. *N. England J. M.*, 1948, 239: 459.

This report from the Lahey Clinic in Boston, Massachusetts, reviews the experience with bronchial adenoma over a period of 18 years. Of 217 histologically classified primary lung tumors, 15 were adenomas—an incidence of 6.9 per cent.

This tumor is usually accessible to bronchoscopic vision and its characteristic gross appearance in most cases will serve to differentiate it from carcinoma. It is a potentially malignant tumor, but the malignancy is of a low grade.

Sixty per cent of these tumors occurred in patients under 40 years of age and a slightly greater percentage occurred in females than in males. Chronic cough, hemoptysis, repeated bouts of pulmonary infection or atelectasis, a localized wheeze, or evidence of obstructive emphysema should arouse suspicion of the possible presence of an adenoma.

Since surgical resection eradicates the area of damaged lung as well as the entire tumor, it constitutes the treatment of choice in most cases. Eleven patients in this series were so treated. There were no deaths. Local removal may suffice for pedunculated tumors without extrabronchial extensions (which are frequent) or irreparable lung damage, but the possibility of recurrence requires continued observation.

The data on the 15 patients are summarized in table form and include age, sex, duration and character of symptoms, physical, x-ray and bronchoscopic findings, treatment, essential pathology, and follow-up. The latter runs from 5 months to 6.5 years in 13 of the cases. In 1 case the treatment has been too recent to justify comment and in another the patient has been lost to follow-up.

HIRAM T. LANGSTON, M.D.

Cytological Diagnosis of Pulmonary Cancer (Citodiagnóstico del cáncer de pulmón). GUILLERMO TERZANO and JOSE MARIA E. MEZZADRA. *Dia méd.*, B. Air., 1948, 20: 2108.

The authors present a review of the possibilities of diagnosis of bronchogenic carcinoma by examination of the sputum or bronchial secretion. The technique for fixing and staining the material, as well as the general description of the cytological elements of normal secretions and secretions from tumor-bearing bronchi are briefly reviewed. The paper is based on a review of the literature and includes a bibliography of 23 references. HIRAM T. LANGSTON, M.D.

HEART AND PERICARDIUM

Analysis of Malformations of the Heart Amenable to a Blalock-Taussig Operation. HELEN B. TAUSSIG. *Am. Heart J.*, 1948, 36: 321.

The Blalock-Taussig operation is designed to increase the circulation to the lungs; therefore, it is of benefit to patients suffering from lack of adequate pulmonary blood flow, provided the heart can adjust itself to the altered circulation.

Patients with the tetralogy of Fallot can adjust to the altered circulation. Other types of malformation improved by operation are those with a cardiac contour similar to that of the tetralogy of Fallot with left axis deviation, those with partial rotation of the heart on its axis, possibly those with pure pulmonary stenosis and an auricular septal defect, and some with unusual arrhythmias. The operative risk, however, is considerably greater in persons who have atypical malformations with pulmonary stenosis or atresia than in those with the tetralogy of Fallot.

The six criteria essential for successful operation are: (1) the primary difficulty must be an inadequate pulmonary blood flow; (2) there must be a pulmonary artery suitable for the anastomosis; (3) a systemic artery must be available for the anastomosis; (4) the pressure difference between the systemic and pulmonary circulations must be great enough for the blood to flow from the aorta to the lungs; (5) the lung structure must be such that the patient can tolerate collapse of one lung and temporary occlusion of one pulmonary artery; and (6) the structure of the heart must be such that it can adjust to the altered circulation.

In an analysis of heart structure it is emphasized that (1) venous blood must be directed to the systemic circulation; (2) the increased volume of oxygenated blood returned from the lungs must be able to reach the aorta; (3) the structure of the particular heart must allow continuous circulation of blood at an accelerated rate; and (4) the structure of the heart must also be such that operation does not cause progressive enlargement.

Less than 5 per cent of the patients have exhibited progressive cardiac enlargement or died of cardiac failure. Thirty per cent have shown no increase in heart size; 30 per cent have shown early increase in heart size with subsequent readjustment; 30 per cent have shown cardiac enlargement during the first 6 postoperative months but no further enlargement thereafter.

The results following use of the subclavian artery for the anastomosis have been as beneficial as when the innominate artery has been used. A patient with the tetralogy of Fallot has a 90 per cent chance of marked and sustained improvement by operation.

JESSE E. THOMPSON, M.D.

Chronic Constrictive Pericarditis. VAGN MORTENSEN and ERIK WARBURG. *Acta med. scand.*, 1948, 131: 203.

After presenting a brief review of the collected material dealing with the syndrome of chronic constrictive pericarditis, the authors give a rather detailed report of their own cases. This comprises 33 cases in all. Twenty-five of these were typical and form the main body of the material discussed. The 8 other cases were considered as probable examples of chronic constrictive pericarditis, but the work-up on them was not conclusive. Four of them were found at autopsy, but clinical data were lacking to prove physiological cardiac constriction; in 2 others the

diagnosis was not confirmed, and the last 2 cases were complicated by a tuberculous empyema so that evaluation of the cardiac status was not accurate.

There were 18 men and 7 women, all principally young people. Tuberculosis, trauma, and rheumatic fever are discussed as the principal etiologic possibilities, but no definite conclusions in this regard were drawn.

The clinical picture is briefly described, along with the diagnostic features of various means of examination. Dyspnea, enlarged liver, distended neck veins, and ascites were common. A protodiastolic gallop rhythm described as a pericardial "click" is given real diagnostic value. The roentgenologic, electrocardiographic, and kymographic findings are given. Venous pressure readings as high as 400 cm. of water are recorded.

Twenty of the 25 patients were treated by pericardiolysis. Of this number 11 have died. Two patients were not benefited but 7 had very gratifying results. Surgical treatment is strongly advocated for constrictive pericarditis, particularly in the younger age groups. Pericardial calcification is believed to greatly increase the risk of surgery and caution is advocated in its presence. When tuberculosis is known to be the cause, surgical intervention is undertaken if the process is believed to be in a quiescent state.

Finally, cardiac insufficiency in young persons, the cause of which is obscure, should call to mind the possibility of a chronic constrictive pericarditis.

HIRAM T. LANGSTON, M.D.

ESOPHAGUS AND MEDIASTINUM

The Injection Treatment of Esophageal Varices Due to Manson's Schistosomiasis. Preliminary Report. CARLOS E. MUNOZ-MACCORMICK. *Laryngoscope*, 1948, 58: 992.

Schistosomiasis is a parasitic disease that in its late stages closely resembles the so-called Banti syndrome, and frequently kills by exsanguinating hemorrhages from esophageal varices. The author describes the pathogenesis of schistosomiasis and the life cycle. The ova which are laid in the intestinal wall instigate a colitis. Those that are swept away by the blood accumulate in the portal spaces. After the embryo dies and is absorbed, the remaining shell which is very resistant instigates a fibrosis which after 10 years or longer produces the syndrome of hepatic cirrhosis. Since the fibrosis is mainly portal, it causes blockage, portal hypertension, and splenomegaly. Anastomoses then begin to form. The veins in the submucosa of the esophagus are one form of anastomosis.

Diagnosis is based upon a history of exposure to contaminated waters, progressive enlargement of the spleen and liver with contraction of the latter at a subsequent time, a clinical picture of cirrhosis of the liver, eosinophilia, and the finding of ova in the feces. Some special diagnostic procedures are biopsy of the rectal mucosa, skin testing with cercarial antigen, and liver biopsy. The administration of fuadin which contains 13.5 per cent antimony seems to be the treatment of choice. The treatment of bleeding esophageal varices has been by thermocauterization, electrocoagulation, or cauterization through a gastrostomy opening. From a surgical standpoint, splenectomy, ligation of the coronary vein, portocaval shunt, and lienorenal anastomoses have been used.

The author presents a case of esophageal varices due to schistosomiasis, with recurrent bleeding after splenectomy. The patient was treated by four injections of the esophageal varices with 5 per cent sodium morrhuate. A satisfactory result was obtained. The author states that as far as he knows, this is the first case of bleeding varices in schistosomiases treated by this method. He suggests that splenectomy, by relieving over 20 per cent of the load from the portal circulation, followed by injection of the varices may prove to be the treatment of choice in cases in which splenectomy is indicated. Recanalization or the formation of new varices is a complicating factor and presents a problem in the timing of injections. ROBERT E. FLORER, M.D.

Spontaneous Rupture of the Esophagus. THOMAS J. KINSELLA, RUSSELL W. MORSE, and AMBROSE J. HERTZOG. *J. Thorac. Surg.*, 1948, 17: 613.

Spontaneous rupture or perforation of the esophagus is more dramatic and tragic than smaller perforations. The condition is more lethal because it is not suspected and the patient's condition is so poor that surgery is not tolerated. On the other hand, smaller perforations usually present little difficulty because of the antecedent history.

The clinical picture is not generally recognized and the majority of cases reported in the literature (over 50) were not diagnosed before death. There is a rather characteristic history with only slightly variable physical findings. The patient is usually healthy, often addicted to alcohol, and frequently a heavy eater. Following vomiting, usually with some blood, there is a sudden excruciating pain, frequently epigastric, which is followed by collapse, shock, dyspnea, and cyanosis. The pain is severe and responds little, if at all, to narcotics. The findings are those of a patient in shock, frequently upper abdominal rigidity, pneumothorax or hydropneumothorax, and subcutaneous cervical emphysema. The differential diagnosis includes all upper abdominal and thoracic conditions. Only 25 per cent of cases have been correctly diagnosed before death because of unfamiliarity with the condition. The most frequent misdiagnosis has been ruptured peptic ulcer.

The authors report 5 cases of spontaneous rupture of the esophagus. In 3 the diagnosis was made before death, and in 2 of these the condition did not permit a surgical procedure. One patient was subjected to thoracotomy with suture of the rent in the esophagus with silk. The immediate postoperative course was favorable until the eighth day when death occurred on account of pulmonary embolism.

Following their experience, the authors have devised the following plan for treatment: (1) treat shock; (2) decompress the pneumothorax by needle aspiration and follow by intercostal catheter drainage; (3) discontinue oral food and fluids; (4) administer adequate chemotherapy; (5) perform a thoracotomy with cleansing of the tissues and suture of the esophagus when the patient's condition permits; and (6) use postoperative suction on the gastric contents for several days and then feed through the nasal tube.

An extensive bibliography is included.

W. HARRISON MEHN, M.D.

Primary Sarcoma of the Esophagus (Sarcome primitif de l'oesophage). J. HORACIO RESANO and ALFONSO ALBANESE. *Rev. chir.*, Par., 1948, 67: 257.

Primary sarcoma of the esophagus is extremely rare, only 60 cases having been published in the literature up to 1944. The differentiation from carcinoma is nearly always impossible prior to surgery or autopsy. Esophagoscopy does not help in the diagnosis as to the kind of tumor, and biopsy should be discouraged in cases in which the mucosa appears intact. Clinically, dysphagia seems to be less severe than in carcinoma but more severe than in benign tumors.

The authors describe in great detail the case of a man 56 years old, who complained of dysphagia, retrosternal oppression, and hoarseness due to paresis of the left vocal cord. An extrinsic tumor of the superior third of the esophagus was removed by the cervical route after resection of the sternal portion of the sternocleidomastoid muscle. Histologic examination revealed a primary fibrosarcoma of the esophagus. The patient gained 9 kgm. postoperatively but died 3 months after surgery of metastases in the trachea. WERNER M. SOLMITZ, M.D.

MISCELLANEOUS

Strangulated Diaphragmatic Hernia. B. NOLAND CARTER and JEROME GIUSEFFI. *Ann. Surg.*, 1948, 128: 210.

In a review of 39 cases from the literature, together with 4 cases from the author's own hospital records, the clinical picture of strangulated diaphragmatic hernia is presented. Emphasis is placed on the striking consistency of the history and physical findings, as follows: (1) history of a previous thoracic injury, (2) physical findings referable to the left chest, particularly displacement of the heart to the right, dullness or tympany in the lower portion of the thorax, adventitious sounds, and aspiration of bloody fluid from the left pleural cavity, (3) roentgenologic findings suggestive of a high left diaphragm with displacement of the heart to the right, and (4) signs of acute gastrointestinal obstruction with particular emphasis on the fact that where the stomach alone is strangulated there is absence of abdominal distention and a patent intestinal tract.

The use of a combined thoracicoabdominal incision is recommended in the surgical treatment.

BENJAMIN GOLDMAN, M.D.

Anesthetic Block of the Vagus and Phrenic Nerves and of the Sympathetic Trunk at the Neck in Thoracic Surgery. Its Protective Effect on the Arterial Blood Pressure. Experimental Study. (Il blocco anestetico del vago del simpatico e del frenico al collo in chirurgia toracica. Sua azione protettiva sulla pressione arteriosa. Ricerche sperimentali.) FRANCO SOAVE. *Chirurgia*, 1948, 3: 193.

Nine dogs were used in the author's study. A Ludwig manometer connected up to the femoral artery was used to control the blood pressure. Under intravenous anesthesia and artificial respiration by means of the Palmer apparatus, the pleural cavity on the right side was opened. With a long curved forceps a mild traction, compression, or both was exercised on the pulmonary hilus as a whole and on its constituent structures (bronchus, artery, vein) separately.

One of the animals died during the manipulations; however, the remaining 8 invariably exhibited a drop in blood pressure, with the traction or compression as described. The pulmonary vein seemed to react to the manipulations with a greater and a longer lasting drop in blood pressure than did the hilus as a whole, the bronchus, or the pulmonary artery. This behavior on the part of the pulmonary vein leads the author to believe that he has substantiated the work of Morin and Dei Poli (*Arch. Sc. med., Tor.*, 1937, 48: 229) on the special sensory receptors in the wall of the pulmonary vein.

After the control tracings were recorded the large nerve trunks in the neck were then blocked in each of these animals with from 10 to 15 c.c. of 0.5 per cent novocain. The tracings were then repeated under the same conditions as before. The nerve block did not entirely prevent the drop in blood pressure; however, the drop was unimportant, in fact, often imperceptible, and leads the author to regard the blocking of the three large nerve trunks in the neck as a valuable therapeutic adjunct in the surgery of the thoracic cavity. JOHN W. BRENNAN, M.D.

SURGERY OF THE ABDOMEN

GASTROINTESTINAL TRACT

Gastroscopic "Cytodiagnosis" (Über gastroskopische "Zytodiagnostik"). HANS STOLLREITER. *Deut. med. Wschr.*, 1948, 23: 330.

Fifty-eight patients with gastric disturbances, observed by the author at the Ludolf-Krehl Medical Clinic of the University of Heidelberg, were studied cytodiagnostically. The material for examination was obtained by means of a small alteration (Hartert) at the end of an ordinary flexible gastroscope. The method is without trauma to the mucosa. In the recognition of the eventually present cancer cells, the atypical forms, and especially the relation between the protoplasm and the nucleus of the individual cells, were given the most important place in the diagnosis. Details of the cytologic studies will be given in a separate article by Doerr, the pathologist.

In 28 of these 58 cases there was a certain clinical diagnosis of inflammation (ulcus, gastritis) and the cytologic findings corresponded perfectly. In the remaining 30 cases, with a clinical diagnosis of carcinoma, or the suspicion of carcinoma, the cytodiagnosis gave valuable supplementary aid to the clinical, roentgenologic, and gastroscopic findings in 20 (66%) patients. In several instances in which the clinical examination did not give unequivocal certainty of cancer, the cytologic study furnished evidence of such urgency as to justify operation. In these cases the surgeon was thus brought in contact with a cancerous process which was still at a stage in which resection could be attempted.

The majority of gastrologists have regarded the perfecting of the roentgenologic demonstration of the gastric mucosal pattern as the most promising means of bettering the early diagnosis of gastric carcinoma. Others have turned to gastroscopic photography as the best means of directly inspecting and recording (by repeated photography) the suspicious lesion for comparative purposes. In this sense gastric cytodiagnosis may also be regarded as a direct method of mucosal inspection. The method is particularly adapted to the study of conditions existing in the medial and proximal portions of the stomach, and in this regard it may serve as a fortunate supplementation of the roentgenologic methods which are better adapted to the study of the medial and distal regions. JOHN W. BRENNAN, M.D.

Vagotonic Gastric Colic Simulating Perforated Gastric Ulcer (Vagotonische gastrische Koliken unter dem Bilde des Ulcus ventriculi perforatum). CARL BLUMENSAAT. *Chirurg.*, 1948, 19: 289.

Proper interpretation of severe colicky pain will require differentiation between organic and functional spasms as well as determination of their special organic relation (gastric, intestinal, biliary, pancreatic, or renal). Operation for apparently well defined perforated gastric ulcer frequently reveals normal conditions. Pseudoperforation symptoms have been attributed to a neurosis of the solar ganglion, due to extension of inflammatory gastric conditions along the lymphatics to the solar plexus. Cases have been described, however, in which no gastritis or other symptoms of inflammation could be demonstrated. Darup has attributed such cases to intestinal and vascular spasms due to a disequilibrium between the vagus and sympathetic system.

In patients with ulcer, secondary pancreatitis may give rise to perforation symptoms. In 5 of 39 patients presenting the picture of perforated ulcer of the stomach with peritonitis, diagnosis could not be confirmed, that is, in 12.6 per cent of the series. These 5 cases are described in detail and the symptoms are tabulated; they reveal a striking similarity to those observed in perforated gastric or duodenal ulcer.

Two types of cases were distinguished in this group: (1) a type characterized by acute onset, more or less marked bradycardia, no rise in temperature, and an extremely short course (12 to 24 hours); and (2) a type in which symptoms developed over a course of 3 or 4 days, followed by sudden severe exacerbation with violent pain and a picture resembling perforation peritonitis. Even in this type, however, there was no typical gastric anamnesis. The temperature was elevated and there was no bradycardia in this group, while the duration of symptoms varied from 4 to 6 days.

The picture in the first group would not justify the conclusion that the condition was of gastritic or inflammatory origin. In the second group, the chief etiologic factor would seem to have been gastroduodenitis without demonstrable pathologicoanatomic gastric lesions. In the former group the condition was probably one of vagotonic gastric colic. Adrenalin and atropin were injected into these patients for diagnostic and therapeutic purposes. Adrenalin was thus probably used for this purpose in cases of this kind for the first time.

Acute nonmechanical gastric dilatation has also been interpreted as a pathologicosympathetic control of the stomach, or sympathetic stigma. The same holds true for acute gastric dilatation following contusion of the abdomen. Whether these vagotonic gastric colics simulating perforated ulcer are caused by central, peripheral, or intramural influences on the parasympathetic system cannot be definitely determined. Probably some local organic sensitivity of the receptive apparatus of the vagus nerve is involved. Bradycardia is a known symptom of vagotonia.

Differential diagnosis must include, besides exclusion of the various organic colics mentioned, elimination of tabes and thyreotoxicosis. Adrenalin and

pilocarpin may be of value in excluding tabes, since their administration in tabes will release fresh attacks. In the gastric crises of thyreotoxicosis the uncontrollable vomiting is a distinguishing feature. In order to exclude perforated ulcer in these cases with bradycardia, but without fever or other signs pointing definitely to perforation, the surgeon should await the results of the atropin and adrenalin tests. If the symptoms then subside within 0.5 or 1.0 hour, further postponement of the operation is justified, at least for 4 to 6 hours after the onset of symptoms. In some cases an exploratory laparotomy will be imperative in order to exclude perforation. If the symptoms subside following the administration of these drugs, atropin should be given in fair-sized doses for a period of several days in the vagotonic cases, and appropriate conservative therapy should be administered in the gastritic cases.

EDITH SCHANCHE MOORE.

Gastrojejunal Ulcer: Clinical Features and Late Results. JAMES T. PRIESTLEY and ROBERT H. GIBSON. *Arch. Surg.*, 1948, 56: 625.

In order to have a basis for comparison of the relative value of partial gastrectomy and vagotomy in the management of jejunal ulcer, it appeared worth while to review the results that were obtained in the treatment of jejunal ulcer prior to the use of vagotomy. By this means one can derive some opinion regarding how effective vagotomy must be in order to supplant partial gastrectomy. Data on 283 patients with jejunal ulcer who were operated on in the Mayo Clinic from 1937 to 1942 have been reviewed and as many of the patients as possible have been followed up to determine the late result.

The cause of jejunal ulcer is similar to that of duodenal ulcer. The routine use of gastroenterostomy in the treatment of duodenal ulcer is followed by a relatively high incidence of jejunal ulcer. Similar use of moderately high gastric resection with complete removal of the pyloric antrum is followed by a low incidence of jejunal ulcer. The ultimate frequency of jejunal ulcer after vagotomy and gastroenterostomy remains to be determined. Prevention is of paramount importance in any consideration of jejunal ulcer. Diagnosis of this lesion usually is not difficult. The complications are hemorrhage, perforation, and gastrojejunocolic fistula.

Treatment of jejunal ulcer is primarily surgical. To date the best results have been obtained by disconnection of the gastroenteric stoma, excision of the jejunal ulcer, and adequate gastric resection of the posterior Polya type. With this type of treatment results are satisfactory over a period of from 5 to 10 years in approximately 87 per cent of the patients who have undergone previous gastroenterostomy. Results are less satisfactory if the original operation is partial gastrectomy. From a physiologic point of view vagotomy would seem to be a sound procedure if the original operation is partial gastrectomy. Late results of vagotomy in the treatment of jejunal ulcer remain to be determined. Of 44 cases in which this procedure was performed, the immediate results have been good in 19 of 24 cases in which vagotomy was performed for jejunal ulcer that developed after partial gastrectomy, and in 19 of 20 cases in which jejunal ulcer developed after gastroenterostomy.

The Surgical Treatment of Peptic Ulcer. GEORGE CRILE, JR. *Surg. Clin. N. America*, 1948, 28: 1123.

The treatment of gastric ulcer is primarily a surgical problem involving excision of a potential cancer, whereas the treatment of duodenal ulcer is essentially a medical problem and operation is required only when the symptoms are rendered intractable by complications.

In the treatment of gastric ulcer, gastric resection is the treatment of choice. Since there is almost no tendency for marginal ulcers to develop after operations for gastric ulcer, there is no need to perform a vagotomy unless the values of free acid are unusually high. When the ulcer is located so high that it can not be resected without removing all of the stomach, satisfactory results can be obtained by vagotomy provided a biopsy is made to rule out malignancy. Small gastric ulcers can be treated by excision of the ulcer with vagotomy and gastroenterostomy. Vagotomy alone of a gastric ulcer, without resection, excision, or biopsy, should not be employed because of the danger that carcinoma might be present.

The surgical treatment of duodenal ulcer is still controversial. Some still believe that radical gastric resection is the treatment of choice whereas others prefer the more conservative procedure of vagotomy combined with pyloroplasty or gastroenterostomy.

About 85 per cent of the patients with duodenal ulcer seen at the Cleveland Clinic made satisfactory progress on medical management. In the surgical management, the author prefers transabdominal vagotomy coupled with a conservative operation to afford drainage of the denervated stomach. This preference is based on an experience of but 2½ years, but justification for this form of treatment is the result of "superior results" to those obtained by any other method of treatment. Two hundred and twenty-eight transabdominal vagotomy operations have been performed at this Clinic with 4 deaths, a mortality rate of 1.3 per cent. This is slightly less than the mortality rate for gastric resection at the same Clinic in the past 10 years (2.8 per cent).

In the treatment of jejunal ulcer, the author prefers transabdominal vagotomy if no obstruction is demonstrable in the roentgenogram. If obstruction is present, a vagotomy is performed, the old gastroenterostomy taken down, and a new one made. The results in 17 patients who were treated in this manner have been excellent and there has been no recurrence of symptoms. These patients have been followed from 1 month to 28 months after operation.

The technique of vagotomy and gastroenterostomy is reviewed as well as that of pyloroplasty.

The author believes that the transabdominal vagotomy coupled with pyloroplasty or gastroenter-

ostomy is (a) safer than gastric resection, (b) more effective than gastric resection in controlling the tendency to recurrent ulceration, and (c) attended by lesser morbidity and disability than is gastric resection. HAROLD LAUFMAN, M.D.

The Surgical Treatment of Ulcer (Chirurgische Ulkusbehandlung). A. PLENK and A. ZECHMANN. *Wien. med. Wschr.*, 1948, 98: 238.

One hundred thirty-eight cases of stomach ulcer were diagnosed clinically and roentgenologically. However, in 24 of these it was proved that the diagnosis was incorrect. Four patients did not have a callous ulcer; they were treated by pyloromyotomy; 15 per cent of the patients had carcinoma which was recognizable macroscopically and these were subjected to resection. The remainder of the patients had callous ulcer which failed to respond to medical treatment, 56 were subjected to the Billroth I operation, 57 to the Billroth II operation, and one was subjected to the Madlener operation. The mortality was zero, and today at the Allgemeinen Oeffentlichen Krankenhaus in Linz, Austria, gastric ulcer is treated surgically with the exception of only a few cases (patients under 40, with serious complicating disease, or with permanent cure after one period of internal management).

Vagotomy is not done; in ulcers of the cardia in which internal management is not successful, carcinoma is suspected and a Madlener resection is done.

Resection was done in 215 cases of duodenal ulcer. In 200 of these the Billroth II operation was done and in 15 resection by exclusion of the duodenum was done. The latter method has been pretty well abandoned, with credit to Finsterer. One patient died on the sixth postoperative day of cardiac insufficiency. Vagotomy was added in only 18 per cent of the cases. This procedure did not lower the mortality; the author fears disturbance of the emptying of the stomach with this operation.

There were 35 patients with gastric ulcer combined with duodenal ulcer. One of these patients was operated upon by the Billroth I operation, 20 were operated upon by the Billroth II operation, and 14 were subjected to resection with exclusion of the duodenum. The total mortality was 5.7 per cent (2 patients). In these 2 patients the ulcer had involved the esophagus.

The author's material for jejunal peptic ulcer comprised 12 patients. Five of the ulcers followed retrocolic gastroenterostomy, 4 followed antecolic gastroenterostomy with a Braun anastomosis, 1 followed pyloric exclusion, 1 an antecolic Billroth II operation with a Braun anastomosis and 1 a retrocolic Billroth II operation with a Braun anastomosis. Eleven of the patients with jejunal ulcers were subjected to a Billroth II operation and 1 was subjected to resection with exclusion. In this group of 12 patients there was 1 death from bilateral pneumonia 2 days after operation. The results of resection with retrocolic gastrojejunostomy in the jejunal ulcer cases, especially those developing after antecolic gastroenterostomy with Braun anastomosis, are regarded so favorable that this procedure will be continued. The author is inclined to regard the jejunal ulcer following the two-thirds resection with retrocolic anastomosis as "surgically incurable," and believes that vagotomy, with or without subsequent resection, is justified in these cases.

Of the 18 patients with massive hemorrhages, 2 were treated conservatively and both died; the remaining 16 were subjected to resection and 1 of these died. In these cases mistaken diagnoses of esophageal varices will occur. When the hemorrhage did not seem to threaten life it was managed expectantly, always with good results; however, success in these cases was ascribed to careful selection of the cases for such treatment rather than to the hemostatic treatment instituted. In these cases Meulengracht's diet was not started until 3 to 5 days following the hemorrhage.

Not to be included in this group of conservatively managed patients are those with a history of previous hemorrhages but without anemia, or with only a moderate degree of anemia when they come to operation. In these the indication for operation is practically without restriction. However, the authors' faith in this absolute rule has been shaken by a recent experience. The patient was 50 years old with hypertension and a long history of ulcer hemorrhages. At the time of admission, however, the hemoglobin was 95 and the erythrocyte count 4,980,000. Two internists did not place any contraindications to the resection, and the patient had every sign of that type of bleeding ulcer which Allen and Benedict and Thompson declare to be an absolute indication for early operation; nevertheless, 14 days after the operation the patient developed bronchopneumonia and died.

There were 67 patients with perforated ulcer, of which 2 had a jejunal peptic ulcer. Of these 14 were subjected to resection and 52 to invagination and suture. All the resections were done in cases of duodenal ulcer. In 12 of the 52 patients in whom only closure by suture was done, gastric ulcer was present, and in 39, duodenal ulcer. There were 2 cases of jejunal ulcers in this group. There were three deaths among the total of 67 patients (4.5 per cent). Suturing is regarded as the normal method of managing these cases of perforated ulcer, when possible without drainage, especially in the acute ulcers with a brief history of illness. However, these patients subjected to suture are re-examined every 3 months, and when possible the resection is put off until later. Primary resection is carried out when the condition is exceptionally opportune for resection, when the suture technique is impracticable (e.g., in a niche of a gastric ulcer), and when resection is practicable.

The authors do not favor the recently recommended method of treating the freshly perforated ulcer conservatively (gastric drainage with conservative treatment of peritonitis), as the method is too dangerous because of the difficulty of choosing the patients for such treatment. JOHN W. BRENNAN, M.D

Gastric Polyadenoma (I poliadenomi gastrici). AMEDEO BILLI. *Chirurgia*, 1948, 3: 163.

The author presents 2 case reports of polyadenoma occurring in women, one of them aged 60 years and the other, 73. Gastric resection was resorted to in both cases with uneventful recovery.

The history and physical findings are not characteristic and the diagnosis is usually made by means of x-rays. The use of the gastroscope permits a more accurate diagnosis. The symptoms are usually of two main types: those caused by pyloric stenosis and those caused by invagination into the duodenum. The complications are ulceration or malignant degeneration. Some authors report that from 50 to 60 per cent of the tumors become malignant. If there is one tumor or a few closely placed tumors, local excision may be used. However, if the adenoma is sessile or there are multiple tumors present, wide excision is advised. LUCIAN J. FRONDUTI, M.D.

Esophagojejunostomy and Esophagogastrostomy in Inoperable Carcinoma of the Esophagus and Gastric Cardia (Oesofagojejunostomie a oesofagogastrostomie u neoperovatelných nádorů jícnu a kardie). VLADISLAV RAPANT and JAN KUČERA. *Lék. listy*, 1948, 3: 397.

Twenty-four patients with carcinoma of the cardiac portion of the stomach and of the lower two-thirds of the esophagus were treated surgically at the surgical section of the Palacky University in Olomouci, Czechoslovakia, during the period from August 1, 1946 to May 1, 1948. Of these, 13 patients were operated upon by radical resection of the tumor, and 5 died. Of the 3 with carcinoma of the intrathoracic portion of the esophagus, 1 died; of the 10 with carcinoma of the cardia (in 6 of these the intra-abdominal portion of the esophagus was also involved), 3 (20%) died. Of the remaining patients, 5 came to operation. Of these, 2 were operated upon palliatively, with use of the esophagojejunostomy as recommended by Allison (*Thorax*, 1946, 1: 239); there was 1 death. This patient died of cardiac syncope. The operation revealed a huge carcinoma of the gastric cardia, penetrating into the esophagus and diaphragm, with secondary growths in the liver. The authors raise the question as to whether even this palliative procedure is indicated in the presence of ascites. In the remaining esophagojejunostomy, on the other hand, the difficulty in swallowing was removed, the patient feels well, has gained weight, and is free of the troublesome nocturnal regurgitation.

F. d'Allaines and Ch. Dubost (*Mém. Acad. Chir.*, 1948, 7415–6: 151) have been doing an esophagogastrostomy as the palliative procedure of choice and seem to want to reduce the operation to the status of an exceptional procedure. The authors do not sympathize with this attitude; they believe that such an attitude would be a step backward in surgical progress, and that the newer surgical procedures demand a revision of the surgeon's attitude towards operability in these cases. However, they do think that even the palliative operation is contraindicated in the presence of constant pain in the interscapular region, palpable metastases in the lesser peritoneal sack, fever, advanced cachexia, ascites (interference with the blood current in the vena cava), metastases in the supraclavicular fossa, paralysis of the nervus recurrens, and invasion of the bronchus by the malignant process. JOHN W. BRENNAN, M.D.

A Combined Abdominothoracic Incision Particularly Adapted for Use in Total Gastrectomy and Esophagogastrectomy. ARNOLD J. KREMEN. *Surgery*, 1948, 24: 605.

The author presents a detailed description of his technique for an abdominothoracic approach adaptable for use in total gastrectomy and esophagogastrectomy, as well as in the repair of large paraesophageal hernias. Although several similar incisions have been described previously—notably those of Marwedel in 1903, Kirschner in 1920, Ohsawa in 1933, Humphreys in 1946, Garlock in 1946, Harper in 1947, and Carter in 1947—none of these incisions provide principally for an abdominal dissection with the idea of extending the horizon of total gastrectomy to include removal of additional segments of the lower esophagus.

The patient is placed in a supine position on the operating table with a sandbag under the left side, which produces about a 10 degree elevation from the horizontal. A kidney brace is fastened on the right side of the table to hold the patient in position when the table is rotated later in the operation. The skin incision begins near the lateral edge of the right rectus muscle slightly above the umbilicus and extends horizontally and upward to the left costal margin where the eighth costal cartilage crosses the seventh interspace. The incision is carried through the abdominal wall into the peritoneal cavity. Abdominal exploration is carried out at this time and operability of the lesion is determined. If a decision to proceed with resection is made at this point, the operating table is rotated, elevating further the left side of the patient to 20 to 25 degrees from the horizontal. The eighth costal cartilage is cut and the incision is extended into the pleural cavity through the seventh interspace as far as the midaxillary or posterior axillary line. If total gastrectomy alone with infradiaphragmatic esophagojejunostomy is to be performed, incision of the diaphragm about halfway from the costal margin to the esophageal hiatus is carried out. If an additional segment of the esophagus is to be resected, the diaphragmatic incision is continued to the esophageal hiatus. The left phrenic nerve, as it passes along the lateral surface of the pericardium, is crushed early in the operation. This reduces the motion of the diaphragm and aids in its subsequent repair and healing.

Dissection of the stomach particularly around the cardia and high along the lesser curvature in the area of the left gastric artery is markedly facilitated by removing the barrier of the costal margin. The abdominal portion of the operation, dissection of the lower stomach, transection of the duodenum, and

duodenal closure are readily accomplished. Mobilization of a jejunal loop for esophageal anastomosis is facilitated, and, if necessary, one can readily section one or more of the mesenteric vessels near their origin to gain added mobility of the jejunal loop, as recommended by Sweet. All portions of the operation are performed without limitation of exposure. Because of the added exposure, a wider and more complete excision of lymphatic-bearing tissue can be accomplished. Although the incision opens two serous cavities, it is believed that the added exposure gained allows for a more careful dissection, preparation, and anastomosis, so that leakage and infection, which has been the principal cause of a fatal outcome in most reported cases, are less likely to result. Resection of an added segment of esophagus in doing a total gastrectomy is readily accomplished with the exposure obtained, whereas in doing a transabdominal total gastrectomy one cannot with ease sacrifice more than small segments.

Closure of the intercostal incision is as follows: The diaphragm is circumferentially sutured to the anastomotic jejunal loop to prevent any herniation of abdominal viscera into the thoracic cavity. The last few anterior sutures in the diaphragm are placed from the peritoneal surface and tied later from below, after the intercostal incision has been closed. In two areas, the rib above and below the incision is bared of periosteum, and perichondral sutures of No. 0 chromic catgut are passed around the ribs, care being taken to avoid catching the intercostal nerves. Tying of these sutures closes the intercostal space. Further closure is obtained by interrupted No. 000 or No. 0000 silk sutures uniting the cut intercostal muscle bundles. Closure is reinforced by suturing the serratus anterior muscle.

The abdominal component of the incision is closed in the usual fashion with interrupted No. 000 silk in the peritoneal layer and in the anterior rectus sheath. Because of the length of the incision, the closure takes considerable time. The time can be shortened by having two closure teams working from either end toward the center.

Two potential disadvantages are pointed out by the author. First, unless the patient is rotated somewhat laterally there is a tendency for the heart to interfere with exposure in making a high esophagojejunal anastomosis above the diaphragm. Second, with this exposure one is limited to dissection of the esophagus below the hilus of the lung and the inferior pulmonary vein. An anastomosis must therefore be done below the hilus. Consequently, the incision is not useful in lesions of the midesophagus or above the diaphragm. HAROLD LAUFMAN, M.D.

End-to-End Anastomoses after Gastrectomy. Technique of Suture Following Hemisection (Anastomoses termino-terminales après gastrectomie; procede de suture après hemisection). J. HUGUIER and C. L. CHATELIN. *Rev. chir.*, Par., 1948, 67: 211.

The authors' technique of subtotal and total gastrectomy with end-to-end anastomosis is given.

End-to-end anastomosis seems to be the procedure of choice after gastrectomy because it allows a more extensive resection, thus eliminating the possibility of marginal ulcer, and because it is a more physiological procedure re-establishing the normal continuity of the digestive tract. However, this procedure is not without contraindications. It should not be used, first, in the presence of deperitonealized duodenum; second, in cancer of the fundus requiring extirpation of the retropyloric lymph nodes; and third, when mobilization of the duodenum is insufficient. The procedure is indicated in (1) benign gastric or pyloric ulcer, (2) perforated ulcers, if the condition of the patient justifies gastrectomy, and (3) bleeding ulcer. Moreover, the authors advocate its use after total gastrectomy for carcinoma of the cardia, and advise an esophagoduodenal anastomosis.

GERARD GAGNON, M.D.

Intussusception in Children. Diagnosis and Therapy with Barium Enema. HANS HELLMER. *Acta radiol.*, Stockh., 1948, Supp. 65.

In an extensive treatise including diagrams and roentgenograms the author describes the picture of intussusception in children, and the technique and results of reduction by barium enema under continuous roentgenologic control. The study is based on 162 cases of intussusception occurring in 137 patients who were diagnosed by means of roentgenograms at the University of Lund, Sweden, during the past 14 years. Forty per cent of the patients were less than 1 year of age.

As a preliminary to reduction plain roentgenograms were taken in the upright and supine positions primarily to exclude other pathologic states—sometimes located above the diaphragm. The combined diagnostic-therapeutic enema is given by introducing barium through a soft rubber rectal catheter under hydrostatic pressure which is controlled by elevation of the barium reservoir. Fluoroscopic and roentgenologic observation is maintained during the entire time. The importance of the assistant *ad anum* in tightly compressing the buttocks to prevent leakage along the catheter is stressed. Also it is essential that an adequate supply of contrast medium is available at every stage of the procedure: Hellmer uses a 10 liter enema container which is fitted with a thermostat and a stirring device. During the diagnostic portion of the procedure the hydrostatic pressure is kept low (from 50 to 60 cm.) in order that short intussusceptions will not be inadvertently reduced before they can be studied. When the invagination has been located and studied the pressure is increased; ordinarily a pressure higher than 1.5 meters is not used. Hydrostatic pressure alone is used chiefly for the reduction, and taxis is avoided unless it is required in forcing the intussusceptum back through the ileocecal valve.

No anesthesia whatsoever is used.

As a criterion of successful reduction it is necessary that the entire colon and cecum be completely filled with the contrast medium. When the reduction

is complete the barium will pass unhindered to a point fairly high in the small intestine.

Reduction with a barium enema was successful in 130 of the total 162 cases (80.2%). In these 130 cases the point of origin of the intussusception was found to be in the small intestine in 60 cases and in the colon in 9 cases; it could not be definitely ascertained in 61 cases. In 30 cases the reduction had to be completed by surgical intervention, and among these cases 9 deaths occurred. In 2 cases in which reduction by means of a barium enema failed, spontaneous reduction occurred. There were no deaths in the cases reduced by the barium enema alone. There was a recurrence rate of 16.5 per cent among the cases reduced by enema, which is somewhat higher than the recurrence rate following surgical treatment. WAYNE FIELD CAMERON, M.D.

A Case of Anthrax Intestinalis (Sluchai ot anthrax intestinalis). R. STOYTCHEV. *Chir. orthop.*, Sofia, 1948, No. 2-3: 107.

A 17 year old girl suffered chills, fever, and generalized abdominal pains following a meal. The attack lasted until 8 o'clock in the evening when the fever dropped and the patient slept the whole night. The next day there were 3 similar attacks of chills and pain which became steadily worse. Nose bleed lasted the whole day and she vomited all of the food she had eaten. During the following 2 days the condition became worse and there were 2 more attacks of chills; convulsions occurred and the mind became clouded. On entrance to the hospital a diagnosis of ruptured appendix was made and the patient was operated upon as an emergency.

Upon opening of the abdomen there issued from the peritoneal cavity considerable hemorrhagic exudate. The appendix was removed although it was not obviously pathological, and as the patient suddenly changed for the worse the abdomen was hurriedly closed. She died some time later.

Autopsy disclosed a discolored portion of the small intestine, from 10 to 12 cm. in length, immediately above the ileocecal valve, as well as portions of the large intestine covered with a dark colored exudate. The mesenteric and retroperitoneal lymph glands were enlarged. On section the wall of the affected portion of the intestine was found to be edematous throughout with a diameter of from 2 to 2.5 cm. Involving the mucosa was a carbunclelike discolored mass. In the mucosa of the stomach, also, immediately below the cardia, was a carbunclelike lesion, clearly delimited, of irregular form and irregularly necrotic, which protruded into the gastric lumen. In both carbuncles were great quantities of anthrax bacilli.

The author recalls a similar case in 1940 in which anthrax bacilli were found in the spinal fluid sediment, but were at that time considered to be a contamination.

Although the diagnosis during life of intestinal anthrax is exceedingly difficult, nevertheless in all cases presenting a severe abdominal septic picture the possibility must be considered and the anthrax bacillus should be sought in the blood, spinal fluid, and feces. Once the bacillus is demonstrated, which should not be too hard to do, treatment should be initiated immediately with large doses (300 to 500 cm.) of antitetanic serum, given intramuscularly or intravenously, for 2 or 3 days (Andreev).

Recently penicillin has been highly recommended for anthrax infection, but even this type of treatment must be started early.

JOHN W. BRENNAN, M.D.

Duodenal Ulcer—A Follow-Up Study of 305 Veterans Discharged Because of Ulcer. ALLEN E. HUSSAR. *Gastroenterology*, 1948, 11: 183.

Duodenal ulcer among military personnel was a much discussed problem in the medical literature during World War II because of its incidence, and the difficulties encountered in establishing the diagnosis and in finding the proper policy for the disposition of the soldiers. Because veterans are receiving disability compensation if their ulcer was initiated or aggravated by military service, a postwar problem arose: What is the fate of duodenal ulcer in patients who are being compensated for their illness? Three hundred and five veterans were interviewed and re-examined in order to adjust their compensation received from the government according to the status of their ulcer and the degree of disability. The average length of time elapsed since their separation from military service was 34 months. Only 5 patients had undergone surgery; 300 had medical management.

X-ray examination revealed ulcer crater in 22 per cent, irritable bulb in 11 per cent, deformed bulb in 41 per cent, and negative findings in 26 per cent of the cases. Clinical activity as determined from the patient's symptoms was found in 60 per cent. From x-ray examination and symptoms, the ulcer was diagnosed as active in 68 per cent and inactive in 32 per cent of the cases. From the patients' histories it was learned that since their separation from service 6 per cent had no recurrences, 9 per cent had no symptoms so long as they adhered to the diet, 12 per cent had rare recurrences, 30 per cent had frequent recurrences, and 43 per cent had almost continuous symptoms. Thirty-eight per cent of the patients who had followed an adequate or fairly adequate ulcer regimen had frequent recurrences or continuous symptoms and were therefore classified as intractable to medical management. The figures obtained from both sources, case histories and x-ray findings, were higher than could be expected from noncompensation experience.

The unusual figures were explained by the presence of the compensation factor which caused the patients to exaggerate their symptoms and interfered, through a psychosomatic way, with the healing of the ulcer. Evidences of improper ulcer management existed. There were also good reasons to believe that these patients had more emotional conflicts than noncompensation patients. Suggestions

were made to eliminate the compensation factor, to educate the patients, and to make psychotherapy available to them. BENJAMIN GOLDMAN, M.D.

Use of the Defunctionalized Loop of Jejunum in Biliary and Pancreatic Surgery. L. W. PETERSON and WARREN H. COLE. *Arch. Surg.*, 1948, 56: 445.

The authors present both roentgenographic and clinical evidence of reflux of the jejunal contents into the biliary tract following anastomosis of a jejunal loop to the hilar bile ducts for stricture and absence of the common bile duct. Reflux occurred even though enteroanastomosis between the ascending and descending loops of jejunum had been performed. In 2 patients, subsequent severing and turning in of the ends of the proximal or ascending limb of jejunum resulted in immediate cessation of chills and fever and an asymptomatic course thereafter. This observation led the authors to adopt the principle of constructing valves or folds in the proximal arm of the jejunal loop leading to an anastomosis between a loop of jejunum and such structures as pancreatic cysts and the gall bladder, even though an anastomosis was made between the two arms of the jejunum. At no time has roentgen examination showed reflux of barium up the proximal limb of jejunum past such folds or valves through the stoma connecting the intestine with cysts.

Animal experiments showed that the flap type of valves atrophied to such an extent that the valve function would appear impossible. On the other hand, valves made by infolding the jejunal wall showed no evidence of atrophy or other significant change for at least 8 months.

The authors found that use of the Roux Y principle in anastomosing the jejunum to the common duct for strictures of the common duct or resection of the head of the pancreas was satisfactory. Originally they constructed valves or folds in the jejunal limb but no longer do so, because reflux of food or secretion would have to take place against the peristaltic mechanism. They recommend that the arm of the jejunum above the Y enteroanastomosis be at least 16 inches (41 cm.) long.

When cholecystenterostomy is performed for inoperable carcinoma of the pancreas, they do not modify or lengthen the operation by the construction of folds or valves, since the patient will probably die before symptoms of suppurative cholangitis develop. However, when the small intestine is anastomosed to the gall bladder or other structures for benign lesions, they recommend construction of two or three folds in the proximal arm of the jejunum even with an enteroanastomosis. JOHN L. LINDQUIST, M.D.

Ectopic Appendix (Apendice ectopico). A. R. ALBANESE and S. CHOUHY AGUIRRE. *Cirugia*, 1948, 1: 235.

The authors report 2 cases of ectopic appendix vermiformis. In the first the entire large bowel was isolated left of the abdominal midline. Unable to find the colon or appendix through a McBurney's incision, closure was performed, and roentgen studies revealed the position of the bowel. At a second operation the appendix was delivered through a left iliac incision and removed. Recovery was without incident.

In the second case, 2 years later, when neither the cecum, colon, nor omentum was found in their normal position through a McBurney's incision, a dressing forceps inserted into the left iliac fossa produced the omentum and a second forceps delivered the cecum with the appendix. The latter was removed. The patient's recovery was uneventful.

The location of the appendix depends upon the partial or complete rotation of the bowel, which presents the following possibilities: (1) normal, in right iliac fossa; (2) oblique colon, with partial rotation of the bowel, the appendix lies high under the liver in the superior right quadrant of the abdomen; (3) in complete rotation with the small intestine in the right hemiabdomen and the entire colon in the left iliac fossa; (4) situs inversus, in which there is transposition of all the organs of the abdomen; the sigmoid will be in the right and the appendix in the left iliac fossa. This condition, the authors believe, should be designated complete appendicular ectopia. When the appendix and cecum alone are displaced the term cecoappendicular ectopia should be employed.

STEPHEN A. ZIEMAN, M.D.

Volvulus of the Transverse Colon (Le volvulus du côlon transverse). CL. OLIVIER and H. LIBAUDE. *Presse med.*, 1948, 56: 541.

The authors discuss the problem of volvulus of the transverse colon, and state that only 16 case reports appear in the literature.

Volvulus of the transverse colon occurs almost always in females past 50 years of age who have had a long history of chronic constipation. The presence of a megacolon can often be demonstrated. The abdominal pain is usually colicky in nature, oftentimes similar to that experienced in the passage of a urinary calculus. Even though the obstruction from the volvulus is almost complete, vomiting is a late sign, and the general well-being of the patient is preserved for quite a long period.

The evolution of the illness is slow. Most of the patients whose cases are reported in the literature were operated upon not less than 3 days after the onset of symptoms. The abdominal distention, which is predominantly periumbilical, is asymmetric in that it crosses the midline on an oblique axis from one or the other hypochondrium to the opposite iliac fossa. The roentgen study of the colon by barium enema usually shows complete arrest of the barium column at the most distal portion of the volvulus.

Volvulus of the transverse colon frequently is caused or accompanied by other local lesions such as polyps, neoplasms of various sorts, or inflammatory conditions of the immediate area. Early recognition and operative correction of the condition involved is mandatory in order to reduce the significant mortality of the disease. ORVILLE F. GRIMES, M D.

The Response to Vagotomy in Idiopathic Ulcerative Colitis and Regional Enteritis. CLARENCE DENNIS, FRANK D. EDDY, HOWARD H. FRYKMAN, AUSTIN M. MCCARTHY, and DARRELL WESTOVER. *Ann. Surg.*, 1948, 128: 479.

A study of the experience with idiopathic ulcerative colitis at the University of Minnesota Hospitals, Minneapolis, during the 10 year period ending January 1, 1944 revealed that 57 patients were treated expectantly and nonsurgically throughout, or until the situation had deteriorated to a desperate point, with a 28 per cent hospital mortality, and that more than one-half of the group so treated from 1934 to 1936 were dead by the time the study was undertaken. Furthermore, cancer of the colon took a high toll in all cases in which the colon was allowed to remain.

Twenty-five patients were subjected to elective ileostomy at a time when there was a reasonable choice, with a resulting mortality of only 8 per cent —a decided improvement. However, this method of treatment failed to salvage the diseased colon and subjected the patient to a radical and deforming surgical procedure as well as to the complications of skin erosion and ascending ileitis.

A case is presented of a 20 year old girl who had had five-sixths of the ileum and the colon removed for ulcerative colitis, and who continued to suffer from ascending ileitis. Vagotomy was proposed as a possible corrective measure, and was carried out with astounding relief of the patient's symptoms. This was followed by similar treatment in 4 cases selected early in the course of their disease. These patients were followed for a period of 6 months and likewise responded very well. In view of the results, a more extensive clinical study was planned.

Twenty-eight patients who had undergone vagotomy for ulcerative colitis were studied. These patients presented many phases of the disease, and 4 died. In one case death occurred before surgery could be attempted, and this case is not included in the study. The 3 remaining deaths were caused by (1) apparent auricular fibrillation, (2) intra-abdominal abscess and fistula between the ileum and sigmoid, presumably present before vagotomy, and (3) recurrent intestinal obstruction apparently related to previous abdominal surgery. Twenty-five patients remained for follow-up study. Vagotomy alone was done in 16 of these, 4 of whom were not completely asymptomatic after surgery; 5 patients are unimproved; and the remaining 6 showed marked improvement, as did many of the patients who had already undergone an ileostomy, or an ileostomy concomitantly with the vagotomy.

Certain of the special studies of these vagotomized cases reveal interesting facts. The average weight gain was 15 per cent. Proctoscopy revealed improvement in the rectal mucosa in 7 cases, and complete healing in 4 cases; in 2, there was no improvement and in 3 the mucosa appeared worse.

Roentgen changes were striking and showed improvement in all but one case. The response was best in those cases in which preoperative study did not reveal complete loss of distensibility and haustral markings of the colon.

Stool examination revealed less frequent blood, pus, and mucus after vagotomy, but none of the patients was entirely free of all three constituents.

An attempt was made to evaluate the transit time of food through the various segments of the gastrointestinal tract. Gastric delay in emptying after vagotomy is well known. The mean small bowel passage time increased from 3.5 hours to 7.5 hours, and the colon passage time from 3.1 hour to 11.3 hours.

The mechanism of improvement in ulcerative colitis following vagotomy is unknown. That the vagal effect and fibers, thought to end in the midcolon, probably extend to the anus is very likely.

The patients with ulcerative colitis who showed the greatest improvement following vagotomy were those with the earliest signs of the disease and the least permanent changes in the colon.

FREDERICK C. HOEBEL, M.D.

Volvulus of the Cecum. CLAUDE F. DIXON and ALFRED C. MEYER. *Surg. Clin. N. America*, 1948, 28: 953.

Twelve cases in which volvulus of the cecum was encountered at the Mayo Clinic were analyzed. In all cases failure of normal fixation of the cecum was manifested. Eleven of the 12 patients had had previous operations, 10 of them abdominal, and in 2 cases volvulus occurred in the immediate postoperative period.

The signs and symptoms of volvulus of the cecum are those of a low intestinal obstruction, but absence of vomiting and passage of gas and fecal material by rectum do not preclude diagnosis early in the disease.

Occasionally diagnosis of volvulus of the cecum may be made on roentgenographic examination. A hugely distended loop of large bowel is apparent and the presence of gas in the small intestine is evident but the colon is not distended.

Simple detorsion and fixation, if possible, are the best treatment in the absence of gangrene. Resection over a three-bladed clamp is the safest procedure when gangrene is present.

Intermittent volvulus of the cecum does occur. A new operative procedure is suggested for its correction.

Certain Considerations of Acute Volvulus of the Cecum (Quelques considérations sur les volvulus aigus du caecum). JEAN SÉNÈQUE and MAURICE COUADE. *J. chir.*, Par., 1948, 64: 409.

A review of 40 cases of acute volvulus of the cecum, collected from the literature, is supplemented by 6 case histories from the authors' material.

In some instances the cecum may be rotated as much as 720 degrees. In 4 of 6 cases the distended cecum formed a right angle with the ascending colon. The author states that the length of the mesocolon represents the radius of the arc described by the cecum in its migration, that distention of the right

colon always provokes a certain degree of rotation, and that gaseous distention is not the only cause of volvulus, excessive peristalsis being an important factor.

Volvulus of the cecum occurs with approximately equal frequency in men and in women, and the majority of patients are over 30 years of age. Usually the general condition of the patient remains good for a relatively long period of time.

Two roentgenologic signs are of great diagnostic importance:

1. Empty space in the right iliac fossa and the presence of incisurae characteristic for the colon; namely, coarser, farther apart and more shallow than those in the ileum.

2. If scout pictures of the abdomen do not furnish sufficient information, pneumoperitoneum has not occurred, and the general condition of the patient is satisfactory, a barium enema may be employed. No barium is allowed to pass the obstacle in the ascending or transverse colon.

Operative relief of torsion must be supplemented either by a cecopexy, or, if this is impossible, a cecostomy or hemicolectomy. Cecostomy permits immobilization of the cecum and better drainage than that which is obtained through a colon tube introduced through the rectum. Cecostomy is indicated especially in advanced cases of volvulus; it should be done through a special incision. As a rule, the cecostomy closes spontaneously. Hemicolectomy is indicated when an abnormally long gut is implicated or when the vitality of the affected cecum is greatly impaired. Exteriorization is condemned.

The authors believe that prophylactic treatment is of great value. An ectopic cecum which is recognized clinically, roentgenologically, or in course of appendectomy should be properly immobilized. Repair of a sliding hernia should be supplemented by immobilization of the cecum and the adjoining portion of the colon.

Of 44 patients in whom the evolution of the condition could be followed, 12, or 27 per cent, died from volvulus. JOSEPH K. NARAT, M.D.

Surgical Management of Carcinoma of the Colon and Rectum. T. E. JONES. *Surg. Clin. N. America*, 1948, 28: 1159.

Improvements in the surgical management of carcinoma of the colon and rectum during the past 25 years are attributed to improvements in surgical technique and the application of physiologic principles to the preoperative and postoperative care. Early diagnosis, by virtue of improvements in roentgenology and in the allied fields of medicine, also has been a contributing factor.

A further plea is made for early diagnosis on the part of the practicing physician, since many patients who reach the surgeon in an inoperable condition have been examined previously.

As to the choice of operation, the one fundamental prerequisite is an extensive and as radical an operation as possible. Whether this is done by the closed or open method, by the one-stage or two-stage method, or by any other technique, makes little difference provided the surgeon can show that his results, from the standpoint of mortality and morbidity, are equal to those of other techniques. Perfecting one technique is considered by the author as more desirable than trying every new procedure that is introduced. The type of procedure must fit the needs of the patient. Obstruction, subacute perforation, or fixation must alter the course of even the strongest advocate of the one-stage procedure. Eventually less depends on the method used than on the manner of its execution. The mortality figures in recent years show a range of 10 to 25 per cent for the same operation. The author feels that this disparity is probably due to the manner of execution.

One of the greatest difficulties of resection of the right colon, particularly in the very obese patient, is peritonealization of the right gutter. Improperly completed, it will lead to adhesions and obstruction, a definite factor in mortality. For several years the author has obviated this complication by the use of the modified Mikulicz pack. This pack prevents the small intestine from becoming adherent to the area and the postoperative convalescence is therefore much smoother. The technique for the use of the pack is reviewed. With careful postoperative attention the cavity created by the pack assumes the shape of a vertical sinus within a week, and the wound is entirely healed in 6 to 10 weeks. In selected cases the omentum can often be employed to cover denuded surfaces. When its use is favorable, no problem exists. In resection of the right colon for growths in that area, the author does not employ a two-stage procedure unless there is obstruction or perforation of the growth.

In the operative treatment of lesions of the transverse colon it is important to carry out a complementary tube cecostomy in conjunction with a one-stage procedure. Resection is performed in the manner best suited to the case. If the cecostomy tube is removed on the fifth or sixth day the stoma will be closed by the time the patient is discharged from the hospital. In cases of marked obstruction, which is generally not the rule, the tube cecostomy should be performed first under local anesthesia, followed in a week by resection.

In regions of the splenic flexure mobilization may be difficult because of adhesions to the spleen and it may be necessary to remove the spleen with the lesion.

In the treatment of lesions of the descending colon and sigmoid, the author has come to prefer the Rankin modification of the Mikulicz procedure. Since this modification has been employed, the mortality for resection of lesions in this area has dropped from 14 per cent to 5 per cent.

The author reiterates his firm conviction that the treatment of carcinoma of the rectum and rectosigmoid is the one-stage abdominoperineal resection (Miles). In a series of over 1,000 cases, the mortality was 7.2 per cent. One hundred and thirty-seven

consecutive patients were operated upon without a single fatality.

"Time alone will tell whether the mortality, morbidity and curability justify" . . . the employment of sphincter-saving operations.

HAROLD LAUFMAN, M.D.

LIVER, GALL BLADDER, PANCREAS, AND SPLEEN

On Surgically Treated Hepatitis. STEN BRATTSTRÖM. *Acta chir. scand.*, 1948, 97: 55.

The author cites earlier reports in the literature of acute hepatitis with a prolonged course in patients who were treated by means of perfusion of the biliary passages, with good results. The beneficial effect has been ascribed to the washing away of an assumed mucus plug in the choledochus which constituted a relative obstruction to the biliary flow when secretion pressure was lowered by primary hepatitis. In this connection, a brief account is given of recent French studies on the physiology and pathophysiology of the biliary passages by means of cholangiography and manometric measurements during operation. The authors of these studies stated they were able to show that a condition of dystonia within the biliary passages, or disturbances of the neuromuscular co-ordination in the sphincter system play an important role in the origin and course of certain acute prolonged hepatitic conditions.

Experience suggests that a closer analysis of the dystonias, by means of cholangiography and manometric measurements of pressure conditions during operation, would facilitate a rational surgical therapy in certain conditions of hepatitis by indicating vagotomy, splanchnicotomy, or sphincterotomy. Experience already gained in this field affords further clarification of the beneficial effect of external drainage of the choledochus, long recognized in several quarters.

From the surgical department of Halsingborg's County and Municipal Hospital, the author reports 14 cases in which the clinical diagnosis was acute hepatitis and the surgical procedure consisted of drainage of the choledochus. In all of the cases, biopsy of the liver was done at operation, and the 13 surviving patients were re-examined. In 13 cases intervention resulted in immediate improvement, although in several instances there were serious microscopic changes, and the biopsies revealed parenchymal lesions. Two patients subsequently developed cirrhosis, and after a lapse of 6 months one had a recidivation of the hepatitis.

The author stresses the importance of the dystonias of the biliary passages in certain prolonged cases of hepatitis and points out that in many instances these are amenable to surgical treatment, and that conservative therapy should not be pursued unduly long, as disastrous effects on the liver parenchyma may ensue.

Cholangiographic and manometric studies during operation may, on careful analysis, afford indications for intervention involving the vagus, the splanchnicus, or the sphincter of Oddi. Pending further experience of these measures, external drainage of the choledochus provides a fairly safe procedure which undoubtedly has a beneficial effect on the hepatitic process. BENJAMIN GOLDMAN, M.D.

Gangrenous Cholecystitis: A Clinical and Pathologic Study of 100 Cases. LEONARD C. HALLENDORF, MALCOLM B. DOCKERTY, and JOHN M. WAUGH. *Surg. Clin. N. America*, 1948, 28: 979.

The series of 100 cases studied by the authors represented about 2.5 per cent of all cases of cholecystic disease in which operation was performed, and constituted about 33 per cent of all cases of acute cholecystitis in which surgical exploration was performed at the Mayo Clinic. Males and females were affected about equally, while 57 per cent of the patients were more than 50 years of age. The symptoms were severe when the patients were seen early; in delayed cases the symptoms were often minimal.

A palpable gall bladder was present in 39 per cent of the cases. Obstruction of the cystic duct was present in 93 per cent of cases, while in 89 per cent this obstruction was due to a gallstone impacted in the duct. Perforation of the gall bladder was present in 24 per cent of the cases; there were no free perforations in this series.

Histologically, there were massive necrosis, congestion, edema, hemorrhage, thrombosis, fibrosis, and subintimal arterial edema and proliferation. Infiltration of polymorphonuclear cells, indicating infection, was present in 41 per cent of the cases.

Cholecystectomy, although difficult in some cases, was done in these 100 cases with 3 deaths.

It was concluded by the authors that most cases of gangrenous cholecystitis are primarily obstructive in nature, because of a stone in the cystic duct. Infection is commonly present, but seems to play a secondary role. Circulatory lesions are predominant, and perforation is frequent. Generalized peritonitis is rare, presumably because of the walling-off influence of the surrounding structures. The treatment of choice in gangrenous cholecystitis is early operation; the operation of choice is cholecystectomy, although in selected cases cholecystostomy is advisable. The results of cholecystectomy in cases of gangrenous cholecystitis are generally good. The best treatment for gangrenous cholecystitis lies in prophylaxis, which consists in cholecystectomy early in the course of the disease. Eighty-eight per cent of this series of patients had had previous attacks.

External Choledochoduodenostomy (Die Choledochoduodenostomia externa). P. E. SCHMIDT. *Chirurg*, 1948, 19: 257.

Following a brief review of the frequently clashing opinions as to the proper indications for external choledochoduodenostomy, the author defines his purpose to be that of extending the indications for this operation beyond that of an emergency procedure, especially as a primary, as opposed to a secondary,

intervention. The latter often comes too late to be of benefit to the patient.

The author presents 13 cases of external choledochoduodenostomy, the postoperative duration of treatment of which averaged 25.9 days. There were no deaths. In 1 case the choledochoduodenostomy was performed as a second operation, and in another case as the third operation on the biliary tract. In 11 of the 13 cases clinical and operative findings were most serious. There was no case of bile peritonitis.

The author believes that this operation is indicated in patients in poor general condition, rather than for drainage of the choledochus. Prolonged bile deficiency leads to digestive disturbances as well as disturbances in blood regeneration and calcium metabolism. Laterolateral anastomosis to the posterior wall of the duodenum will help to prevent constriction of the site of anastomosis. Also tension must be avoided. The author did not mobilize the duodenum, always employing a supraduodenal anastomosis. A transverse incision of the choledochus was made. Suture was performed in two layers, one with catgut (the internal layer) and the other with silk. Neither a biliary fistula nor peritonitis was observed. The internal suture with catgut is the surest guard against fistula, stricture, or recurrence of stenosis.

Three of the patients suffered from cholangitis, and 3 others had symptoms of damage to the parenchyma of the liver. In all of these cases choledochoduodenostomy brought prompt recovery. The same was true of patients operated on during jaundice. Also cholangitis responds to this procedure, if it is done promptly before the walls of the bile ducts become rigid with cicatricial changes. No cases of ascending postoperative cholangitis were observed. The anastomoses in this series were performed for cholangitis, parenchymal damage to the liver, and abscesses, as well as perforations into the intestine and liver, and for massive displacements of the biliary and hepatic ducts due to calculi and cicatricial changes in the papilla of Vater. Not a single biliary fistula was observed, and not a single case of hepatobiliary dysfunction. There was no bile peritonitis and no abscess of the abdominal wall or cicatrice. There was 1 wound fistula at the site of drainage. The advantages of suture in 2 layers, with the inner layer of catgut, are stressed.

EDITH SCHANCHE MOORE.

The Quantitative and Qualitative Control of Bile Flow and Its Relation to Biliary Tract Surgery. R. RUSSELL BEST. *Ann. Surg.*, 1948, 128: 348.

This study is based upon the premise that many of the recurrent or remaining symptoms following gallbladder and common duct surgery are caused by small retained stones and débris, or the recurrence of such stones and débris because of slow flow of viscous bile, low in quality and high in total bile solids. The rate of flow is also affected by spastic or atonic conditions of the sphincter of Oddi, and of stricture or narrowing of the common duct.

It is assumed that if the flow of bile could be qualitatively controlled it would be possible to prevent development of biliary tract stones. This has never been accomplished to date, but a bile can be produced which is thin and watery and less conducive to stone formations by the choleretic effect of bile and bile fractions. Likewise, the quantity of bile and thus the rate of flow through the bile ducts can also be controlled.

The physiology and chemistry of bile and bile fractions is reviewed in relation to the quantity of bile and the quality of the bile produced when these fractions are taken by mouth. Experimentally, ox bile salts (this is unoxidized conjugated glycocholic and taurocholic acid), given orally, increases the volume of bile 36 per cent, increases the total solids 22 per cent, and increases bile viscosity. Dechacid (oxidized conjugated bile acids) increases bile volume 39 per cent and total solids 2 per cent, but does not change the viscosity.

Ketochol increased the bile volume 99 per cent, reduced the total bile solids 8 per cent, and reduced the viscosity of the bile. Decholin increased the bile volume 106 per cent, reduced the solids 22 per cent, reduced the bile viscosity, and was the only one tested that reduced the cholesterol content of the bile.

The last two products are recommended for use in "flushing" the bile ducts and for reduction of the incidence of stone and sludge formation. The author outlines his method of using either of these two products in combination with atropine and nitroglycerin to "flush" the biliary system, and indicates that he uses it routinely following biliary tract surgery; it is used preoperatively in some cases, and periodically in cases in which the common duct has been reconstructed over a vitallium tube or other foreign material likely to become encrusted with precipitation of bile contents. The results as illustrated are good.

FREDERICK C. HOEBEL, M.D.

Reconstruction of the Bile Ducts (Beitraege zum Problem des Gallengangersatzes). GERHARD KNEISE. *Chirurg*, 1948, 19: 261.

On the basis of 3 personally observed cases, the author discusses the reconstruction of extensive defects of the biliary tract reaching almost to the portals of the liver or directly to them. Two methods of bridging these defects are available: (1) direct anastomosis of the remaining extrahepatic or intrahepatic duct with the gastrointestinal tract, or (2) the use of prosthetic material. These two methods have been combined in the Voelcker operation. Attempts to utilize prosthetic or autoplastic materials for such repair have yielded questionable results and involve difficult technical problems.

Any method of repair of defects in the bile ducts involving danger of stenosis with its fatal consequences should be eschewed. Methods in which the use of proper technique will obviate this risk include:

1. Anastomosis of the stump of the hepatic duct to the duodenum, employing, if necessary, a transi-

tory interpolation of a rubber tube according to Voelcker and thus favoring direct union. The Voelcker operation is frequently not feasible, however. The necessary mobilization of the duodenum for this purpose is frequently impossible because of adhesions.

2. Goetze's operation. Here, too, adhesions interfering with mobilization of the duodenum may prohibit this operation.

3. Anastomosis between the stump of the hepatic duct and the jejunum, i.e., hepaticojejunostomy.

4. So-called hepatangiojejunostomy, which has little chance of success.

Good results have been obtained, however, both with Goetze's operation and with hepaticojejunostomy.

The author describes a case of artillery wound in which laparotomy revealed injury of the bile ducts (the common duct, the cystic duct, and the inferior hepatic duct). The duodenum had been torn also, although the lumen had not been invaded. The gall bladder, the cystic duct, and the remnants of the other ducts were removed. The very short stump of the choledochus was closed, and the duodenal wall was sutured and later covered with omentum. The hepatic stump was about 2 cm. long. Hepaticojejunostomy was followed by speedy recovery. Three months later the patient reported that he was in splendid health. Exclusion of the jejunal loop renders access of the intestinal contents to the bile ducts almost impossible. This constitutes a great advantage over other biliary-intestinal anastomoses. Because of the absence of tension between the biliary stump and the highly movable loop of the small intestine, exactly approximated sutures and supplementary overcasting are possible, which diminishes the danger of fistulization.

Another case in which the Goetze plastic procedure was employed is likewise described in detail. The result was successful in spite of preoperative jaundice of 6.5 weeks' duration, fever, and debility. No signs of biliary stasis were observed following the operation nor of stasis of food in the bile ducts of the liver, which conditions have frequently been complained of as results of this operation. The Goetze operation is very rapid as compared with hepaticojejunostomy. The two procedures have their special indications.

In certain cases the use of prosthesis or autoplastic material for the repair of defects cannot be avoided. A case is described in which severe jaundice and gallstones demanded intervention 2 months following thyroidectomy. The technique used was employed because very rapid intervention was indicated on account of the very poor condition of the patient. In liberating the neck of the gall bladder, the hepatic duct and a portion of the choledochus were resected. A T-drain was inserted to replace the resected portion, one limb being inserted into the intrahepatic orifice of the hepatic duct and the other limb into the choledochus. The drain was covered with omentum in the hope of forming a sort of canal through the tissue. After a stormy postoperative session, the patient recovered. The drain was removed and the fistula closed. Further observation will be needed to evaluate the end results of this procedure in this case. This operation should be done only as a last resort.

In the absence of an extrahepatic bile duct rest, the Goetze operation with duodenal anastomosis, or, if the duodenum is immovable, a jejunal anastomosis, is indicated. When ample extrahepatic duct rests are present, hepaticojejunostomy is indicated.

EDITH SCHANCHE MOORE.

Four Years after the Reconstruction of the Common Duct with a Rubber Tube (Quattro anni dopo la ricostruzione del coledoco con protesi di tubo di gomma). ANTONINO CIMINATA. *Chirurgia*, 1948, 3: 83.

The author illustrates a case of reconstruction of the common duct with a rubber tube prosthesis. At operation an anomaly was found in which the gall bladder was interposed between the hepatic duct and the common duct, no cystic duct being present. The gall bladder was contracted, thickened, and contained stones. There were stones in the common duct also. After cholecystectomy there was a gap of 4 cm. between the hepatic and common ducts. This was bridged by means of a rubber tube measuring about 6 cm. which fitted into either end so well that no sutures were used to anchor it. The area was packed with a gauze pack and rubber drains. The postoperative course was uneventful and the gauze packs were left in for 3 weeks, after which they were gradually removed in 1 week. There was very little bile drainage.

A roentgenogram taken after 5 months showed the tube to be still in place. The patient was not seen for 4 years, because of the war. After 4 years, when roentgenograms were taken, the tube was no longer seen. Since the patient did not have any attack of pain which would suggest the passage of the tube the author is inclined to believe that the tube became macerated and was passed in small pieces. He postulates that the common duct regenerated over the rubber tube, the latter acting as a guide. The method of inserting the tube snugly into either end without the use of sutures and thereby avoiding necrosis of the mucosa, is considered to have played a great part in permitting the epithelial lining to regenerate and bridge the defect. The epithelial lining, in turn, was covered by connective tissue.

LUCIAN J. FRONDUTI, M.D.

Late Results Following Biliary Surgery (Esiti a distanza degli interventi sulle vie biliari). ANTONIO RUFFO. *Arch. ital. chir.*, 1948, 70: 315.

The author analyzes 660 cases of biliary surgery performed at the Surgical Clinic of the University of Turin, in the period from 1922 to 1946. Cholecystectomy was performed upon 530 and cholecystostomy on 86 of the patients. The others had lysis of adhesions or other procedures. The over-all mortality

was 10 per cent. However, this has been decreasing and for the last 10 years alone was 6.9 per cent.

Of the 660 patients, 350 were recalled and of these 95 reported to the clinic. They had been operated upon from 1 to 23 years previously and 54.8 per cent were completely cured, 34.7 per cent were benefited, and 10.5 per cent had not been affected for better or worse by the treatment.

Among the causes for recurrent colic are the functional causes of biliary dyskinesia, which have been well determined only in the last years. By determining whether there is a hypertonicity or hypotonicity, according to the studies of Mallet-Guy who resorted to radiomanometry during surgery, one may attribute the cause to excessive vagal or sympathetic stimulation. These cases may then be treated by sphincterotomy or right splanchnicectomy. These methods may also become efficacious in the treatment of recurrent symptoms following biliary surgery. However, the author believes that the test itself may stimulate the complicated biliary nervous system and, therefore, the diagnostic value may not be as accurate as the originator of the test would claim it to be. The author thinks that observations should be continued for some time before the test is used to determine the definite operative procedure.

LUCIAN J. FRONDUTI, M.D.

Chronic Relapsing Pancreatitis: An Analysis of 27 Cases Associated with Disease of the Biliary Tract. EARL E. GAMBILL, MANDRED W. COMFORT, and ARCHIE H. BAGGENSTOSS. *Gastroenterology*, 1948, 11: 1.

Comparison of the clinical, clinicopathologic, and pathologic features of chronic relapsing pancreatitis with associated cholecystic disease, as exhibited in the 27 cases of this series, with those of chronic relapsing pancreatitis not associated with disease of the biliary tract, as exhibited in the 29 cases of a series recently analyzed and reported, discloses many similarities and remarkably few dissimilarities.

First, the anatomic and histopathologic features of the disease in the pancreas are essentially the same in the two series of cases. Interstitial fibrosis and residual necrosis are rather constant findings. Cyst and abscess formation and the deposition of calcium occur in both. In each series, the pancreatitis most often involves the entire organ, but it may be largely localized to the head, body, or tail, and shows no distinct tendency toward involvement of that part of the pancreas in close proximity to the disease of the biliary tract, that is, the head, when disease of the biliary tract is present.

Second, chronic relapsing pancreatitis, regardless of the presence or absence of disease of the biliary tract, involves males more frequently than females and begins at all ages.

Third, the clinical features of chronic relapsing pancreatitis are essentially the same in the two series.

Fourth, the same sequelae, due to involvement of the pancreas, appear regardless of the presence or absence of cholecystic disease.

Fifth, the most frequent sequela due to pressure of the enlarged pancreas on the neighboring structures is dilatation of the common bile duct, both in the series with and in the series without disease of the biliary tract.

Sixth, in cases in which painful seizures occur, the diagnosis of both pancreatitis and cholecystitis in the same patient is made difficult by the similarity of the clinical syndromes of each disease. The most frequently made diagnosis will be cholecystic disease because (if for no other reason) cholecystic disease occurs many times more frequently than does pancreatitis. However, it seems clear that pancreatitis, as well as complications of cholecystic disease, should be strongly suspected when the painful seizures last days, not hours, and especially so when the pain starts in the left upper quadrant of the abdomen and when the pain extends to the left upper quadrant, left anterior part of the chest, left side of the back or left shoulder, even if cholecystitis also is present. It also is clear that pancreatitis is definitely present in cases of disease of the biliary tract when disturbance of acinar and islet function accompanies and follows acute seizures and the deposition of calcium can be demonstrated. The appearance of a rounded, cystic mass in the pancreatic region during the painful seizure, or soon thereafter, may have the same significance as does diabetes, steatorrhea, and calcification. Finally, it may be said that a high index of suspicion of pancreatitis, more careful analysis of the features of painful abdominal seizures, and careful investigation of pancreatic function in every instance of acute abdominal seizures will increase greatly the frequency with which the diagnosis of pancreatitis is made. Once the diagnosis has been made, the clinician should investigate for evidences of past pancreatitis and be on the lookout for recurring attacks and sequelae of pancreatitis because pancreatitis is often a recurring and progressive disease.

Exclusion of disease of the stomach, duodenum, small and large bowel, kidneys, and heart, and even of retroperitoneal disease may prove a necessary step in the diagnosis of pancreatitis, especially when the patient is seen in the intervals between attacks and in the absence of diabetes, steatorrhea, and calcification. Careful notation of clinical features and appropriate laboratory data will accomplish this.

Seventh, three possible relationships between cholecystitis and chronic pancreatitis have been considered: (1) chronic pancreatitis is secondary to cholecystitis; (2) the cholecystitis may be secondary to the pancreatitis; and (3) cholecystitis and pancreatitis may occur simultaneously and could well be due to the same etiologic agent.

Eighth, removal of the diseased gall bladder is clearly indicated. Chronic duodenal obstruction requires some type of sidetracking operation, as does obstruction of the common bile duct; pancreatic cyst requires either internal or external drainage, and abscess, external drainage. Pancreatolithotomy may be feasible.

The acute exacerbation should be treated medically. Ephedrine sulfate and papaverine hydrochloride should be used for the relief of pain whenever possible. In the event such drugs do not control the distress, the usual opiates must be resorted to. The intravenous administration of fluids to combat dehydration, hypochloremia, alkalosis, and acidosis, as the case may be, decompression of the gastrointestinal tract, and accepted measures for combating shock also are used as indicated. During the acute attacks operation to drain an abscess or pseudocyst rarely is advisable. Between the acute seizures, a bland diet is given and alcohol is forbidden. Diabetes is controlled. Insufficiency of external pancreatic secretion with resulting steatorrhea and azotorrhea is treated by a high caloric, high protein, high carbohydrate, low fat diet, by substitution therapy in the form of enteric-coated pancreatin tablets, or by both measures.

The clinical picture, the pathologic physiology, and the course or the pathologic alterations in the pancreas in cases of chronic relapsing pancreatitis are very constant regardless of the presence or absence of disease of the biliary tract.

The problems of diagnosis of chronic relapsing pancreatitis are increased by the presence of associated disease of the biliary tract. Awareness of the possibility of pancreatitis and familiarity with its clinical features, roentgenologic findings, and tests of pancreatic function should lead to a correct diagnosis in a high percentage of cases.

Treatment of chronic relapsing pancreatitis associated or unassociated with disease of the biliary tract is the same, except that there is need for surgical removal of the diseased gall bladder.

Evidence has been cited supporting the thesis that in chronic relapsing pancreatitis, disease of the biliary tract may be secondary to that of the pancreas.

Splenic Panhematopenia. S. Van Creveld. *Arch. Dis. Childh.*, Lond., 1948, 23: 163.

Primary splenic panhematopenia may be congenital or acquired. If acquired, it may arise acutely or it may be secondary to pre-existing enlargement of the spleen. Proof that the dysfunction of the spleen is primary is provided by the favorable effect of the removal of the spleen and any accessory spleens. The condition is characterized by a striking decrease in erythrocytes, leucocytes, and platelets, and can be differentiated from aplastic or hypoplastic anemia by the finding of hyperplastic bone marrow.

In splenic panhematopenia which is secondary to splenic enlargement, removal of the spleen does not remove the original cause of the enlargement of the spleen, but it may improve the clinical state and prolong life.

Two cases are reported—one of primary splenic panhematopenia (secondary to splenic enlargement), and the other of secondary splenic panhematopenia due to hemolytic jaundice. In both cases, splenectomy gave excellent results. Samuel Kahn, M.D.

Splenectomy: When Is It Indicated? Frank H. Lahey and John W. Norcross. *Ann. Surg.*, 1948, 128: 363.

The authors' discussion of indications for splenectomy is divided into three groups. Group 1 includes splenectomy for trauma, primary tumors and cysts in the spleen, wandering spleen, and to add to the completeness of radical gastric surgery for malignancy, or to facilitate surgical exposure in the left upper quadrant of the abdomen.

Splenectomy for trauma may be accomplished more quickly and bleeding may be controlled with less difficulty if the spleen is approached directly by separating the lateral peritoneal reflection and swinging the spleen and its pedicle medially into the operative field. The pedicle may then be ligated directly. This exposes the renal pedicle which, in direct force injuries, is frequently injured simultaneously and must therefore be examined during surgery.

Group 2 includes those cases in which abnormal splenic physiology affects the peripheral blood cells or the bone marrow, and the production of red and white blood corpuscles and the platelets. This group which once included only congenital hemolytic anemia and idiopathic thrombocytopenia purpura must now be expanded to include certain other types of hypersplenism. It is essential in all cases in this group that other factors possibly responsible for the disease be carefully scrutinized, and that careful peripheral blood studies, and particularly bone marrow studies, be made. The co-operation of the surgeon and the physician is imperative.

Congenital hemolytic anemia, an hereditary abnormality in which the blood cells are spheroid and smaller than normal, is accompanied by jaundice and increased urobilinogen output in the urine and hyperbilirubinemia, due to increased hemolysis. The bone marrow shows normaloblastic hyperactivity. Splenectomy in these cases resulted in 90 per cent cure, and improvement in the other 10 per cent of patients.

Acquired hemolytic anemia, acute or chronic, will rarely respond well to splenectomy if the cases are carefully selected. It should not be done in malignancy, infection, or in parasitic diseases producing hemolytic anemia.

Idiopathic thrombocytopenic purpura is a hemorrhagic disease of unknown origin. If the bone marrow reveals plentiful megakaryocytes with little platelet formation at the periphery and no evidence of infiltrating disease in the bone marrow, if the eosinophils are not increased, and all studies reveal the condition to be idiopathic, it will respond well to splenectomy. The response is usually prompt following surgery, is rarely delayed, and relapses may occur even years following surgery.

Idiopathic neutropenia, when other causes of neutropenia are carefully ruled out and the bone marrow is normal or shows hyperplasia of granulocytic cells, is included in the group for surgical consideration. Response to splenectomy is prompt and results appear to be lasting.

In primary splenic panhematocytopenia, all of the main cellular elements of bone marrow are depressed in the peripheral blood. The etiology is unknown. Congenital and acquired types are described. In either type the bone marrow demonstrates hyperplasia of all three elements. Response to splenectomy is prompt.

Secondary splenic panhematocytopenia may rarely (in selected cases) respond well to splenectomy.

Group 3 includes the congestive splenomegalies, and splenomegalies of unknown origin. In the congestive group there is portal hypertension, gastric and esophageal varices likely to hemorrhage, and occasionally panhematocytopenia. Splenectomy is generally recommended to control the panhematocytopenia and may be indicated for other reasons in selected cases. The decision is a difficult one and the mortality of 8 per cent, which is higher than in the other groups, makes the decision a more serious one. The results obtained in selected cases have been fairly good.

Splenomegalies of unknown origin must be studied thoroughly and observed for at least 6 months, and none of the contraindications for surgery must be present if the patient is to be submitted to splenectomy. However, operation is helpful in selected cases and frequently may result in the removal of an early localized malignant tumor, or give early treatment to a congestive splenomegaly.

Agnogenic myeloid metaplasia is a contraindication to splenectomy because the spleen has taken over the function of the bone marrow. Leucemia, lymphoblastoma, polycythemia vera, splenomegalies in infection, Mediterranean and sickle cell anemia, and paroxysmal nocturnal hematuria usually are serious contraindications to splenectomy. One must also weigh operative hazards against the problematical benefit of splenectomy in each case.

The complications which have proved most common to splenectomy are hemorrhage, thrombosis, and infection.

Three operative variants are described: (1) ligation of the lienal artery close to its origin, (2) ligation of the lienal artery by deliberate exposure of the artery at the tail of the pancreas, and (3) the rapid approach herein described.

FREDERICK C. HOEBEL, M.D.

MISCELLANEOUS

Operative Treatment of Abdominal Obesity, Especially Pendulous Abdomen. JENS FOGED. *Acta med. scand.*, 1948, 131: Supp. 213, p. 130.

Operative treatment for pendulous abdomen or for diffuse venter propendens was carried out on 35 patients. All of the patients were women. The indications for operation depend upon the severity of symptoms and the operative risk. The risk is comparable to that of operative treatment of any large hernia, including umbilical hernia, and the same contraindications hold for both lesions—advanced age, cardiovascular disease, and chronic bronchitis being the most frequent contraindications. Intertrigo should be corrected before operation.

The various operative methods are all based on the same principle, namely, excision of the superfluous subcutaneous adipose tissue and skin, and vary merely in the way of incision and its localization. The technique varies according to whether the umbilicus is left untouched, is transposed, or eradicated. The two most important principles are thorough asepsis and minute hemostasis. The outlines of incision are made preoperatively with the patient in an erect posture. In the majority of these patients the technique described by Jolly was used. Compressing bandages were used, and the patients were permitted out of bed the day after operation.

A survey of results in 38 operations on 35 patients revealed that the weight of removed tissue varied from 600 to 6,500 gm., averaging about 2,300 gm. None of the patients died, and in 31 cases the postoperative course was uncomplicated with primary healing of the wound. There was 1 case of shock and 1 case of multiple pulmonary infarcts. There were 2 cases of marginal necrosis of the skin, 2 cases of hematoma formation, and 1 case of suppuration. In only 1 case was there a complication of a serious character. The immediate result was satisfactory to both the patient and the surgeon in 33 cases, the result being classified as unsatisfactory in the case of wound suppuration and the 2 cases of marginal necrosis, respectively. A follow-up of 17 patients for a period of from 6 months to 6 years revealed no recurrence, and the result was considered good in 16 patients.

JOHN L. LINDQUIST, M.D.

GYNECOLOGY

UTERUS

A Correlative Study of Adenomyosis and Pelvic Endometriosis, with Special Reference to the Hormonal Reaction of Ectopic Endometrium. EMIL NOVAK and O. ALVES DE LIMA. *Am. J. Obst.*, 1948, 56: 634.

This study is based on the analysis of the ectopic endometrium of adenomyosis and pelvic endometriosis, as compared to the surface uterine endometrium of 243 patients who were operated upon in the private service of the senior author in Bon Secours Hospital, Baltimore, Maryland, in the 8 year period extending from 1938 to 1946.

This analysis reveals that the endometrium located within these endometrial implants (both adenomyosis and pelvic endometriosis) is usually of an immature variety. Its immaturity is evidenced by the fact that it is physiologically responsive only to the growth stimulus of estrogen, and not to the differentiating influence of progesterone.

In this present series, the ectopic endometrium showed no histologic evidence of secretory activity in any case, regardless of whether or not the surface mucosa was of a secretory type.

JOHN R. WOLFF, M.D.

Fibromyoma of the Uterus During Pregnancy and in the Puerperium (Fibromiomi uterini in gravidanza ed in puerperio). G. TARICCO. *Ginecologia*, Tor., 1948, 14: 257.

Nine women, all over 30 years of age, presented themselves at the Ospedale S. Spirito at Casale Monferrato, Italy. All had uterine fibromyomas and had become pregnant. Four were treated by subtotal hysterectomy and 1 was treated by total hysterectomy; in 3 a myomectomy was done and in 2 of these the pregnancy then went on to term with birth of a living child, while in the third of these cases abortion occurred 20 days later.

The ninth case reported was especially interesting from the therapeutic standpoint. Following an amenorrheal period of 6 months the pregnant woman presented herself with nearly continuous pains in the lower and midabdominal cavity. Clinical and roentgenological examination disclosed, in addition to the pregnancy, the presence of a double-fist-sized mass in the region of the fundus of the uterus. The advanced age (43 years) in this instance made continuation of the pregnancy seem desirable; sedatives were given and the patient was counseled to report periodically. Instead, the patient did not appear until well advanced in labor with a history of more than a month of diffuse abdominal pains and irregular elevations of the temperature. Forceps were applied at the outlet. That same day symptoms of intestinal occlusion developed and the following day a laparotomy was carried out. The peritoneal cavity was found to contain turbid fluid, the small intestines were markedly congested and dilated, and the entire abdominal cavity was involved in adhesions. An ileostomy was all that could be accomplished, the patient dying 5 hours later. Autopsy disclosed a subserous fibroid on the posterior wall of the uterus. This mass was twisted 90 degrees. The capsule had broken through, giving vent to reddish-gray colliquative masses with stubborn adhesions to the greater omentum, descending colon, and sigmoid.

The author believes that in special cases a waiting period may be advisable until the period of viability of the fetus, the patient always being under constant supervision, followed by a cesarean section with myomectomy or hysterectomy, as indicated. In most instances, however, the patient should be operated upon early in pregnancy and, if possible, a myomectomy should be done. In the cases in which the number or location of the fibroids make the birth of a living child improbable an immediate hysterectomy is the only recourse.

JOHN W. BRENNAN, M.D.

The Relations Between Development of Carcinoma and Colposcopically Demonstrated Atypical Epithelium of the Portio (Ueber die Beziehungen zwischen Karzinomentwicklung und dem kolposkopisch gefundenen atypischen Epithel an der Portio). G. MESTWERDT and A. MOENCKEBERG. *Geburtsh. & Frauenh.*, 1947, 7: 156.

Opinions regarding the benign or malignant nature of clinically and histologically demonstrated changes in the epithelium of the portio are frequently widely divergent. In practice, doubtful findings are usually interpreted as carcinomatous. Any confirmation of such a conclusion from the further clinical course appears problematic, since, whereas a 5 year survival is usually considered a cure, the malignant transformation of the portio lesions may require a longer time. On account of discrepancies in the interpretation of histologic findings in the diagnosis of portio carcinoma, other diagnostic aids are recommended. Macroscopic speculum examination of the os uteri and its vicinity with a colposcope will permit a finer diagnosis in the living. By this method a suspicion may be confirmed or rejected. For this reason, a colposcopic examination should be made before a biopsy specimen is taken for histologic study, and removal of the colposcopically demonstrated suspicious area should be done under colposcopic control. If colposcopic findings require histologic interpretation, the mucosa can be examined in serial sections, which will clarify many problems concerning the histogenesis of carcinoma of the portio. No superficial scraping of the epithelium or tiny excision from the portio will suffice. The entire epithelium of the surface of the portio including its substrate and transition to the cervix must be included. The

studies of Hinselmann, Franqué, Leip, and Otto are reviewed. Survival in untreated cases of carcinoma of the portio averages from 1.5 to 2 years. The interval between the first stages of malignancy and the first clinical symptoms of the disease is not known. Leucoplakia may be present for years before undergoing malignant transformation. Whether early stages of leucoplakia can be considered as benign is uncertain. In the present authors' opinion, the potency of the epithelium cannot be determined from the momentary status of the histological section. Histologic pictures of leucoplakia in its early stages, later developing into carcinoma, are extremely rare. Hinselmann has demonstrated histologically the development of a carcinoma from matrix areas, and has, probably for the first time in the literature, followed a case histologically over a period of several years. He emphasizes the importance of following up histologically examined matrix cases. By means of histologic control examinations, Schmidt repeatedly demonstrated development of carcinoma on the basis of vulvar leucoplakia.

The authors describe in detail 2 cases histologically controlled since 1937. In these cases the stages of atypical portio epithelium were followed up histologically progressively in their relation to pavement cell carcinoma of the portio. Variations in growth tempo seem possible. The present study would not seem to justify a distinction between the different stages of atypical epithelium. In many cases the matrix areas have been present simultaneously and adjacent to each other. The authors believe that there is no justification for designating atypical epithelial changes as benign, harmless, or malignant. They should preferably be considered as a whole, as matrix areas of pavement cell carcinoma of the portio, as a unit with gradual variations of malignant potency.

It is emphasized that if all colposcopically visible atypical epithelium be removed for histologic examination, it would be impossible to demonstrate any developing potency of the atypical epithelium. If only partial segments are removed, at various intervals, it will be impossible to determine the stage of development of the areas left *in situ*.

Biopsy must be performed only on the strictest indications. The associated dangers have often been stressed. Obligatory preliminary examination and colposcopic control should determine when and how a biopsy should be done. In this way many superfluous biopsies could be avoided, and an epidemic of portio amputations prevented.

In the first of the 2 cases here reported, the development of carcinoma of the portio from colposcopically demonstrated matrix areas was followed colposcopically and histologically for nearly 6 years. In the second case, colposcopic and histologic control permitted detection of a microcarcinoma 8 months after surgical removal of a colposcopically demonstrated microcarcinoma. The first operation consisted in abrasion and amputation of the portio. Following detection of the last tumor, a total vaginal extirpation was done and followed by postoperative radium and x-ray therapy. In all, 2,422 serial sections of this portio were studied.

EDITH SCHANCHE MOORE.

The Problem of Early Diagnosis of Cancer of the Uterine Body and Cervix (Problema do diagnóstico precoce do câncer do corpo e do colo uterino). ARNALDO DE MORAES. *An. brasil. gin.*, 1948, 13: 1.

By early diagnosis the author does not mean early clinical, but early histologic diagnosis during the asymptomatic phase of cancer. This object can be attained by periodic examination of all women over 35 years of age by colposcopy, colpocytology, and biopsy if indicated.

Colposcopy, introduced by Hinselmann in 1924, is generally accepted in Europe but has met with little enthusiasm in the United States. It is regarded as a valuable aid in South America.

Colpocytology, introduced by Stockard and Papanicolaou in 1917, offers a simple method of studying the cells desquamated from the initial cancer lesions and found in the material which collects in the vaginal cul-de-sac. A small quantity of this material is spread thinly on a slide, fixed with equal parts of alcohol and ether, and treated with Papanicolaou's trichromic stain or any of its modifications. The cancerous cells, mixed with the normal ones, stand out because of their great difference in aspect and staining. They may assume the most bizarre forms: elongated like rods or muscular fibers, and triangular, resembling tadpoles. Intense vacuolization of the cytoplasm is frequent. However, the most striking aspect is that of the nuclei which are always larger and more deeply stained than those of normal cells: their contour is irregular, assuming monstrous arrangements; the chromatin is disposed irregularly in large granules, or there may be just a dense spot that is strongly stained. Atypical mitoses result in deformed pictures: the abnormal fragmentations or the amitotic divisions give rise to internucleated cells with the nuclei differing one from the other. To complete the picture, there are large amounts of pus cells and there are always red blood cells. De Moraes also collects material from the cervical canal by means of a probe wrapped with cotton wool, and from the uterine cavity with a noncutting fine curet similar to that of Cary. From his own experience and study of that of United States authors, he is able to stress the real value of colpocytology in the diagnosis of early cancer. Because of its great simplicity, this examination should be the first to be made and should be used generally in women over 35 years of age, even if they do not have any gynecologic symptoms. Positive or suspicious findings should be verified by colposcopy and biopsy. In the follow-up of patients irradiated or operated upon for cancer, the method is of value for the control of the cure or the investigation of recurrence.

Histologic examination of a biopsy specimen is indispensable to establish the diagnosis of cancer. The present tendency is to regard as incipient cancer

even the intraepithelial lesions called carcinoma *in situ*, intraepithelial cancer, preinvasive cancer, hypertrophy of the basal layer, and the cervical disease of Bowen. The histologic study of these lesions reveals that near, or in, the zone of transition from the external orifice of the cervix there is a definite, abrupt change in the stratified epithelium to the epithelial type that indicates probable malignancy.

A gynecologic consultation service for the prevention of cancer should be equipped for complete careful examination of the patients, including anamnesis, gynecologic examination, colposcopy, colpocytology, and biopsy. RICHARD KEMEL, M.D

ADNEXAL AND PERIUTERINE CONDITIONS

Concerning the Symptom of Hydrops Tubae Profluens and its Significance in the Recognition of Primary Carcinoma of the Tubes (Ueber das Symptom des Hydrops tubae profluens and seine Bedeutung für die Erkennung des primären Tubenkarzinoms). GERHARD BESSERER. *Geburtsh & Frauenh.*, 1948, 8: 610.

Ten cases of carcinoma of the tubes were observed during the years from 1938 to 1947. In 3 of the women, bleeding occurred after the menopause; neither the clinical study nor curettement offered an adequate explanation. In 2 of the 3 patients the correct diagnosis of tubal carcinoma was made from the symptoms alone. These patients had no typical history of pains, and no palpable demonstration of adnexal tumor was observed. In 4 other patients of this group the characteristic hydrops tubae profluens, which the auther prefers to designate "hydrorrhœa tubae profluens," occurred. In the remaining 3 women the diagnosis was apparently not made prior to operation. The chief symptoms in all cases were one or more of the triad: pain, fluor, tumor.

The 4 patients with hydrorrhea are given special consideration. In one patient curettement was done twice with negative results, because no tumor was palpable. It was only later, with the development of the typical profluens, that the tumor was palpable and the correct diagnosis was made (a loss of 7 months to the patient). In a second patient, a diagnosis of urinary incontinence due to cystocele was made and a plastic repair was performed. When the hydrorrhea did not cease, a vesicovaginal fistula was suspected and the patient was referred to the author. However, the fluid could be seen gushing from the vaginal cervical orifice and, with descending pyelography, the fluid from the vagina did not become colored. Operation disclosed a bilateral hydrosalpinx and bilateral carcinoma. In a third instance, the apparent urinary incontinence from cystocele was correctly recognized; however, even the passing of bloody shreds did not lead to the diagnosis of tubal carcinoma; it was only the operation which led to the correct interpretation of the symptom. In the fourth patient the hydrops tubae profluens, recognizable by the typical flooding, resulted in the correct preoperative diagnosis. In none of these patients were tumor cells found in the discharged fluid and shreds; in none was the diagnosis made roentgenologically. In the second case cited, a hysterosalpingography showed both tubes to be normally permeable.

From these experiences, the author does not think that roentgenology is of aid in the diagnosis of tubal carcinoma; however, he believes that it is of value in correctly interpreting and explaining the mechanism of hydrops tubae profluens, or hydrorrhea.

In 6 of the 10 cases, carcinoma of the tubes was diagnosed with certainty, or with great probability. The author states that an absolutely certain diagnosis of carcinoma in these cases cannot be made without the finding of cancer cells; however, in the presence of bleeding without corresponding findings by curettement, or in the presence of hydrops and of hydrorrhea tubae profluens, carcinoma of the tubes must be suspected, and treatment must be the same as though the diagnosis was absolutely certain. This treatment consists in the removal of the uterus and of both adnexa. JOHN W. BRENNAN, M.D.

The Treatment of Blocked Fallopian Tubes by Pressure Injections of Gas and Iodized Oil. ALAN GRANT and ROBERT MACKEY. *Med. J. Australia*, 1948, 2: 199.

One of the most exasperating situations encountered in sterility is that of the married couple in whom the major infertility factor operating is occlusion of the wife's fallopian tubes. An apparently simple solution to this pathological state of the tubes is some form of surgery which establishes an artificial ostium or resects the damaged segment of a tube, by the performance of salpingostomy or by tubal implantations. In practice such a procedure yields a very disappointing harvest of patent tubes and pregnancies.

It is a clinical impression that salpingostomy is a more successful operation when the tubes have been blocked by some extratubal pathological process, such as acute appendicitis, than when they are occluded as the result of a septic miscarriage or puerperal sepsis, in which the normal function of the tube has been badly impaired.

In a survey of 247 cases of tubal block, tuberculosis was reported in 1 case, placental polypus in 1 case, previous cesarean section in 3 cases, peritonitis in 3 cases, previous normal confinements in 4 cases, pelvic operations in 8 cases, ectopic pregnancy in 10 cases, puerperal sepsis in 14 cases, genital hypoplasia in 14 cases, salpingitis in 21 cases, a previous history of appendectomy in 27 cases, no known cause in 69 cases, and a previous history of miscarriage in 72 cases.

The largest group of cases published is the collected series of cases consisting of 818 plastic operations on the tubes; 54 pregnancies took place, an incidence of 6.6 per cent, or one pregnancy for every 15 operations. Complications occurred in many of these pregnancies and the ultimate successful result was one baby for every 22.5 operations.

Treatment with gas injections was carried out. The gas used was carbon dioxide and it was admin-

istered with Sharman's modification of Bonnet's kymograph. The gas was regulated to flow at 65 millimeters per minute, and the pressure was taken up to the maximum of 250 millimeters of mercury. Two such insufflations were given in 10 to 12 days after the conclusion of menstruation in separate months.

The third injection was made with iodized oil, 1 month later. The injection of oil was given at a pressure of 250 to 300 millimeters of mercury, in the x-ray department. An x-ray film was taken at the time, and another plain x-ray film was taken 2 days later. HARRY W. FINK, M.D.

On Female Sterility Due to the Congenital Obliteration of the Abdominal Aperture of the Tube. Surgical Intervention. Subsequent Pregnancy (Sur la sterilite feminine par obliteration congenitale de l'ostium abdominale de la trompe. Intervention chirurgicale. Grossesse consecutive). R. JOYEUX. *C. rend. Soc. fr. gyn.*, 1948, 18: 95.

The frequency of sterility due to tubal obstruction, according to recent reports, is marked as this cause is found in from 45 to 50 per cent of all the cases.

Among all the tubal lesions which prevent conception, inflammatory lesions predominate. Congenital malformations, on the other hand, are comparatively rare.

An unusual case treated by the author and a case he has not found recorded in the literature is reported. This case is one in which there was a bilateral congenital obstruction of the normal openings of normal tubes due to an abnormal continuation of the mesosalpinx which formed a peritoneal hood around the abdominal opening of the tubes.

This occurred in the case of a woman of 22 years, who sought relief from pain in the right iliac fossa of more than a year's duration. Married at the age of 18, she never became pregnant. Her menstrual history was normal. As physical examination revealed her genital organs to be apparently normal, an original diagnosis of chronic appendicitis was made.

Hysterography was performed with the finding of a normal uterine cavity and obliteration of the tubes in the vicinity of the abdominal openings of the tubes. The deformity was identical on the two sides.

Laparotomy was performed and the abdominal extremities of the tubes were found to lie in a cul-de-sac which was formed by a continuation of the mesosalpinx. There were no adhesions, no signs of inflammation, and no abnormality of the tubes or uterus. The appendix was normal. The cul-de-sacs were dissected out with evacuation of the lipiodol used in the hysterography. The tubes were readily catheterized. Incidental appendectomy was performed. Postoperative recovery was normal and 3 months after the operation the patient became pregnant.

The theory that the deformity found at operation was a congenital abnormality is supported by the following facts: at operation there were no signs of pelvic or genital inflammation. There were no adhesions or cicatrices of the tubes or of the mesosalpinges. The tubes were easily catheterized. There was no hydrosalpinx. The lipiodol was in the cul-de-sac and not in the tubes. The deformity was bilateral.

The congenital deformity found at operation led the author to find an explanation of the condition. He studied the development of the hysterotuboovarian ligaments in a 10 cm. human embryo. At the second month of development of the human embryo, the abdominal extremity of the Muellerian duct is intimately united to the superior pole of the ovary and the Wolffian body. These organs later diverge from one another. Then the diaphragmatic ligament divides into two small ligaments, one extending from the posterior abdominal wall to the mesovarium and to the abdominal end of the tube, the other extending from the abdominal end of the Muellerian duct to the superior pole of the ovary. The diaphragmatic ligament normally diminishes rapidly. An abnormal persistence of the diaphragmatic ligament attached to the abdominal end of the tube can form a veritable hood over the tubal pelvis. It was not surprising to find that this hood was purely serous.

In this case hysterosalpingography was instrumental in disclosing the congenital deformity causing sterility.

Tubal sterility, proved by hysterosalpingography, justifies surgical intervention.

BLACKWELL MARKHAM, M.D.

EXTERNAL GENITALIA

The Treatment of Chronic Bartholinitis; New Treatment Procedures; Their Superiority Over Classical Therapy; Question of Recurrences (A propos du traitement des bartholinites chroniques; nouveaux procédés de traitement; leur supériorité sur la thérapeutique classique; question des récidives). MARCEL GAUDEFROY. *C. rend. Soc. fr. gyn.*, 1948, 18: 129.

Acute bartholinitis is essentially of gonorrheal nature, at least in the beginning, and requires immediate local treatment; it should be incised widely (3 cm.) as soon as pus has gathered. Usually, the wound does not close completely, and suppuration continues and results in fistula formation; if it closes, recurrence is practically the rule. In chronic fistulized bartholinitis, two methods of treatment are available: disinfection of the cavity followed by obliteration through sclerosis, and saucerization with the electric knife followed by electrocoagulation of the fundus of the gland.

The first method is indicated in all small cavities (about the size of an almond) in which probing reveals tracts that are narrow and not too deep. Disinfection is obtained by three instillations, at 1 or 2 day intervals, of penicillin G, 5,000 units per c.c., or of soludagénan, 33 per cent, which causes bleeding and sclerosis, or of solufontamide which is less expensive than penicillin and less caustic than soludagé-

nan. If the latter is used, the disinfected cavity may be partially or completely sclerosed, but in most cases a solution of quinine and urethane, 5 per cent each, will have to be instilled three times at intervals of 2 days. It is essential that the entire cavity be sclerosed to avoid recurrence, which occurs in 40 per cent of the cases, mostly because a glandular crypt has escaped disinfection.

The second method is used for conditions which fail to respond to the first method, and is used immediately for large pockets, or multiple and large infected tracts; it is also useful as the second stage in acute infections, about 8 days after the first incision. The operation is performed under intravenous or epidural anesthesia.

In chronic bartholinitis in which incision has been made during the acute stage, the previous incision is reopened and enlarged if necessary, and the gland is marsupialized at the vulvar opening with the electric knife.

In cystic bartholinitis, the internal aspect of the cyst is incised along its greatest length with the electric knife. The internal wall of the cavity is removed, exposing the bottom of the gland which is then electrocoagulated, with destruction of all infected glandular crypts and abnormal tracts. A dressing with a saturated solution of antipyrine is applied to prevent postoperative bleeding. This operation is benign, easy, rapid, and radical; the patient may get up on the evening of the intervention and attend to her occupation the following day. Healing requires from 4 to 6 weeks. The result is excellent; the deformity of the vulva decreases in 2 or 3 months, and the region assumes a nearly normal aspect. Three of 12 recent patients have needed a slight intervention after the operation—one on the third day for local bleeding, the other 2 on the sixth day to destroy a tract that had been overlooked.

RICHARD KEMEL, M.D.

MISCELLANEOUS

Histologic Studies in Cases of Amenorrhea Treated with Progesterone and with Parasympathicomimetic Substances (Histologische Untersuchungen bei mit Progesteron und parasympathikomimetischen Stoffen behandelten Amenorrhoen). K. BURGER and V. DUBRAUSZKY. *Geburtsch & Frauenh.*, 1948, 8: 576.

Thirty-six treatments were administered to secondary amenorrheics with histologic examination of the curetted endometrial specimens before and after each treatment. Five patients were given doryl, which is the German preparation corresponding to moryl (carbamino-cholin-chloride), for 5 days in doses of 2 mgm. thrice daily per os. In this group there was 1 instance of bleeding by diapedesis (not true menstruation). Five patients were given doryl for 5 days in daily, subcutaneous doses of .25 mgm., with again 1 instance of bleeding by diapedesis. Six patients were given prostigmine for 5 days in daily injections of 0.5, 0.5, 0.75, 1.0, and 1.0 mgm. subcutaneously. Two bleedings were produced in this group. In the one there was some proliferation produced by the injections, but the bleeding was by diapedesis; in the other there was already an endometrium in the secretory phase when the treatments were instituted and in this case a true menstrual type of bleeding developed. The author does not claim this as an instance of menstruation produced by prostigmine, as it might have occurred anyhow.

Finally, there were 15 patients treated with progesterone for 5 days in daily injections of 10.0 mgm. In this group there developed 3 instances of true menstrual bleeding and 7 of bleeding by diapedesis.

From these experiences the authors conclude that both the progesterone and the sympathicomimetic substances will produce a certain amount of proliferation and even some evidence of the secretory phase in secondary amenorrhea, and will on occasion produce bleeding by diapedesis—probably as a result of vascular dilatation. However, they will not produce true menstrual bleeding unless the endometrium is already in an advanced stage of secretory transformation. No attempt is made to assess the psychic effects on the patient of the false bleeding. It is admitted that these substances, through their stimulative action on the parasympathetic nervous system, are able to produce some stimulation of the ovarian follicle; nevertheless, they are not to be regarded as suitable for the treatment of secondary amenorrhea.

JOHN W. BRENNAN, M.D.

Report of 5 Cases Operated Upon for Vesicovaginal Fistulas, Complicated in 1 Case by a Functional Incontinence (Comunicacion a proposito de cinco casos de fistulas vesico-vaginales operadas y en uno de los cuales coexistia una incontinencia funcional de orina). JAUN WOOD W. and RAMON DAVANZO A. *Bol. Soc. Chilena obst. gin.*, 1948, 13: 116.

The procedure employed in 4 cases of vesicovaginal fistula consisted in a modified Fueth operation whereby the vaginal mucosa is separated at the fistulous orifice and the mucosa of the fistulous tract is folded into the bladder by means of an inverting stitch through the basal connective tissue. No suture is put in the vesical mucosa and the vaginal margins are approximated with interrupted No. 1 chromic catgut sutures.

This method sacrifices no tissue but permits good approximation without tension or serious alteration of the blood supply.

Vesicocystopexy complemented by posterior colporineorrhaphy succeeded in correcting the remaining case in which urinary incontinence coexisted. The fistula was repaired by means of the modified Fueth procedure.

STEPHEN A. ZIEMAN, M.D.

Treatment of Inflammatory Tumors of the Adnexa by Douglas Puncture and Colpotomy (Die Behandlung der entzuendlichen Adnextumoren mittels Douglaspunktion und Kolpotomie). HEINZ CONTZEN. *Geburtsh. & Frauenh.*, 1948, 8: 265.

The therapeutic value of Douglas puncture in inflammatory tumors of the adnexa is even today a

sharply disputed question. Heynemann has recently clarified the indications for this method of treatment. Although he condemns a categorical rejection of this procedure for the cases in question, he emphasizes the fact that its injudicial application may diminish the chances of recovery. The conservative method remains the standard therapeutic procedure. Any other method, including puncture of the Douglas pouch and colpotomy, must be classified as general expectant and supplementary treatment. If these fail there remains the last resort of laparotomy and extirpation of the inflamed organs.

Douglas puncture is indicated when ordinary conservative measures have failed and conditions permit a technically perfect, and therefore safe puncture. The intervention must be made carefully so that it can be followed by physical therapy under medical supervision. In cases filling these requirements puncture is indicated in the presence of persisting fever and chills, in patients in poor general condition or with cachexia, in the presence of intolerable pain not responding to other measures, in patients with threatening perforation into the intestine, and in cases of failure of the inflammatory tumors and exudate to retrogress.

If possible, puncture should be done only in the chronic or subacute stages. The most meticulous antiseptic and aseptic precautions are imperative. Preoperative preparation of the patient is of the utmost importance in preventing complications. The safest site for puncture is through the posterior vault of the vagina, in the midline, about 2 cm. in back of the vaginal insertion of the portio. The cannula should be inserted to a depth of 1 cm. Blind puncture is recommended by some writers, who believe that pulsating vessels furnish a better guide and can be avoided more easily by palpatory location than by direct observation. Schultz has described the technique of the operation in detail. In the presence of multilocular processes, puncture may be repeated. In some cases as many as 5 punctures have been required to locate the tumor. No undesirable reactions have been recorded. If puncture proves inadequate because of the extent of the process or the viscidity of the pus, or if conditions indicate probable rapid recurrence, the puncture may be followed by colpotomy, and by drainage if necessary.

The incision is made from 1 to 2 cm. in length and from 0.5 to 1.0 cm. in width so that there is little danger of injury to the ureter or vessels. The packing is removed after 24 hours to prevent infection of the wound. Because of the danger of pressure necrosis, the drain should not be left *in situ* for more than 10 days. The feared complications of puncture, namely, general peritonitis or pelvic peritonitis, may be largely prevented by aseptic technique. It is also possible that puncture may lead to the release of pus from a pyosalpinx or pyovarium into the abdominal cavity. Sudden body movements, exertion, external palpation, or vaginal examination may be responsible. Usually severe peritoneal reactions do not result since the pus is encapsulated in the pouch of Douglas, producing a relatively harmless Douglas abscess. Nevertheless, immediate laparotomy is indicated. This possibility must be kept in mind so that perforation can be recognized immediately. With proper instruments and technique there is little danger of injury to the ureters or vessels. Perforation of the intestine may be recognized from the aspiration of feces. In this event, the operation must be discontinued and the patient put to bed with ice applications. The site of perforation is usually rapidly closed with peritoneum. Fistulization rarely results. The puncture orifice is usually closed within 24 hours. Fistulization is more apt to follow colpotomy, which should therefore be used only in cases in which puncture does not suffice. As a rule, colpotomy involves the same risks as puncture, but with the more extensive incision more severe hemorrhage may result and obliterate the operative field. Whereas Heynemann has strictly limited the indications for puncture, Conrad punctures every adnexal tumor having attained a given size and showing fluctuation. The more conservative attitude of Heynemann seems preferable.

In the author's series of 527 patients with acute inflammatory adnexitis, 63, or 12.3 per cent, were treated by puncture of the Douglas pouch or colpotomy. Ovarian insufficiency was demonstrated in 28.9 per cent of this series. It is believed that this condition impairs the powers of resistance and thus predisposes to infection. Treatment by puncture requires 31 days; conservative treatment requires 29 days. Puncture yielded successful results in 65 per cent, or 41, of the cases. Transitory favorable results were obtained in 15.8 per cent. Thus, good results were noted in 81 per cent of the cases. The results were doubtful in 11.1 per cent, and failures were recorded in 7.9 per cent of the cases.

Unfortunately, conditions did not permit any extended follow-up study of this series, so that no conclusions as to late results are available. Usually the patients were advised to continue short-wave therapy, mud packs, and sitz baths for a certain period of time.

Since puncture yields satisfactory results in 80 per cent of the cases and shortens the duration of treatment, it would seem a valuable procedure in the face of the rapidly increasing incidence of gonorrhea and the prevalent diminished resistance to infection.

EDITH SCHANCHE MOORE.

OBSTETRICS

PREGNANCY AND ITS COMPLICATIONS

The Diagnosis of Sex During Pregnancy (A propos du diagnostic du sexe pendant la grossesse). A. GRANJON. *Presse méd.*, 1948, No. 57: 688.

A hormonal test for determination of the sex of the fetus has been published. The injection of 10 c.c. of urine of the pregnant woman is supposed to cause histologic changes and enlargement of the testicle in a rabbit if the embryo is male. This test, however, has proved unreliable in many cases.

The author believes it possible to visualize the scrotum, and in some cases the penis, of the fetus by roentgenography with appropriate technique. At least two or three pictures from different angles are necessary. WERNER M. SOLMITZ, M.D.

Eclampsia Control. T. F. CORKILL. *N. Zealand M. J.*, 1948, 47: 309.

The author presents a résumé of an earlier survey of eclampsia in the Wellington urban area from 1928 to 1939 inclusive, which showed encouraging figures for incidence, maternal mortality, and infant mortality. A later analysis, covering the 8 years from 1940 to 1947 inclusive, indicates still further improvement. Among 29,645 live births, the incidence of eclampsia was 2.8 per 1,000 live births (83 cases). The maternal mortality was 4.8 per cent, and the infant mortality was 20.5 per cent. The important points in eclampsia control through antenatal supervision and treatment are discussed.

Even a minor rise in blood pressure, or a trace of albumin calls for rest and closer watching. Anything more demands hospitalization if possible. In cases in which 36 or 37 weeks have passed there is little advantage in delay, and there should be no hesitation about termination of the pregnancy. At the present time induction of labor is the most important measure in our treatment of pre-eclampsia. In cases in which the patient is in the last month of pregnancy, termination by simple induction of labor is almost always the correct procedure, although very occasionally, particularly in a primigravida in whom the symptoms and signs are of great urgency, and in whom the "unripe" condition of the cervix causes a fear of delayed response, cesarean section has a proper place.

In the treatment of actual eclampsia, the conservative method continued to be used in the great majority of cases. The only obstetrical measures sometimes used in these cases were the early rupture of membranes to relieve pressure and instrumental termination of the labor if the second stage was delayed.

There was an increase in the number of cases in which cesarean section was necessary. Whereas cesarean section was performed only once among 158 cases of eclampsia observed during the period of 1928 to 1939, it was performed in 15 of the 83 cases which occurred in the last 8 year period. In 3 cases, the cesarean sections were performed late, as a desperate measure in patients who had not responded to conservative treatment. All 3 mothers died, which accounted for 3 of the 4 maternal deaths in this period. The postmortem findings make it abundantly clear that such last resort operations are doomed to failure. GEORGE BLINICK, M.D.

Cervical Myoma and Pregnancy (Mioma do colo e gravidez). CELSO MENZEN DE GODOY. *Rev. hosp. clin.*, 1948, 3: 183.

Among the neoplasms of the female genital tract, 75 per cent are myomas of the uterus and these constitute 20 per cent of the gynecologic processes. The incidence of cervical myomas reported by modern authors varies from 1.3 to 16 per cent, and this lower incidence as compared to that of myomas of the uterine body is due to the difference in histologic structure of the two regions and in their vascular conditions, and to the more intimate interrelationship between the ovaries and the uterine body than that between the ovaries and the cervix.

Macroscopically, cervical myomas may be classified into (a) supravaginal (subserosal, submucosal, intramural, and interstitial), (b) intravaginal (submucosal, intramural, and interstitial), and (c) mixed. The myomas may consist of a single nodule, which is the most frequent form, or of several nodules, which form is much rarer.

Microscopically, these tumors consist initially of smooth muscle fibers, easily differentiated from those of the normal myometrium and arranged in disorderly fashion. As the tumor develops, there is marked proliferation of the connective tissue so that by the time the tumor has reached a certain degree of development it consists nearly exclusively of fibrous tissue; hence, the name of fibroma.

The etiology of cervical myoma is still unknown. Even when small, the tumor always produces symptoms which become serious in most cases; they are symptoms of compression on the urethra or on the bladder, depending on the volume, the variety, and the location of the tumor. The most frequent and important symptoms are dysuria, pollakiuria, hematuria, and retention. Retention may be paroxysmal or chronic: in the first, the capacity and the wall of the bladder are not altered; in the second, the capacity of the bladder is increased and the wall is thickened. Retention is progressive and is overcome only by extirpation of the tumor. Hemorrhage is rare and occurs only in submucosal tumors which cause repeated contractions of the uterus in an effort to expel them. Discharge is more frequent than hemorrhage because the myoma mechanically produces a constant state of chronic inflammation of the cervical glands.

Submucosal myomas and those assuming the form of a polyp may undergo secondary changes because of circulatory disturbances (necrosis), direct mechanical action on the polyp (ulceration), and malignant degeneration (carcinoma). In addition, they may undergo calcification, or fatty, hyaline, mucoid, or sarcomatous degeneration, or they may become infected as infection occurs more frequently in these tumors than in myomas of the uterine body, because of the highly pathogenic flora of the vagina and the constant traumatisms to which the cervical myomas are exposed.

The influence of pregnancy on the tumor is slight compared to that on myoma of the uterine body, because it is exerted especially on the muscle fibers which are much less abundant than those in the myometrium. The influence of cervical myoma on pregnancy does not depend principally on its localization and volume. Submucosal and intravaginal tumors of small size generally do not interfere with pregnancy and labor, but submucosal and supravaginal tumors compromise the active segment and may cause an interruption of pregnancy by acting as foreign bodies which cause uterine contractions to expel them. If small, they may not interfere with labor; if larger, they may be a factor in dystocia by obstruction or by preventing dilatation. Intramural tumors may disturb dilatation and be a more frequent factor of dystocia. Interstitial tumors involving the entire cervix usually require intervention which in most cases is dangerous.

Treatment varies from case to case according to the symptoms, form, volume, and localization of the myoma. If there is no pregnancy, the tendency is toward surgery by the vaginal route for submucosal polypoid, small intramural, necrosed, and infected tumors, the abdominal route being reserved for all other forms. During pregnancy, some authors prefer watchful waiting while others insist on removal at any time, even during labor. For intramural forms, expectation is best, with surgical removal after the puerperium; for interstitial forms involving the entire circumference of the cervix, cesarean section should be used.

The author reports 2 cases. One patient presented a submucosal pedunculated polypoid myoma in which polypectomy did not interfere with the normal course of pregnancy. The other patient showed a myoma of the entire anterior half of the cervix and invading the posterior half, associated with a molar degeneration which was followed by chorioepithelioma; in this case total abdominal hysterectomy was performed. RICHARD KEMEL, M.D.

LABOR AND ITS COMPLICATIONS

Rare Injury of the Soft Tissues in Spontaneous Delivery (Ueber eine seltene Form von Weichteilverletzung bei Spontangeburt). E. OTT. *Geburtsh. & Frauenh.* 1948, 8: 274.

In a primipara of 22 years spontaneous delivery was associated with development of a traumatic rectovaginal perforation. No prior diseases, including syphilis, or earlier operations were recorded. Perineal lacerations are known to occur in from 11 to 25 per cent of normal deliveries. They have been classified as first, second, and third degree lacerations. The most severe type is extremely rare and includes laceration not only of the perineum and vagina but also of the sphincteric musculature.

The infant in the case here described was in left vertex position. The pelvic measurements were normal. The blood pressure was slightly raised, and urinary albumin and marked edema pointed to pre-eclamptic toxicosis. However the blood pressure responded to rectal suppositories and the subjective symptoms subsided. No further toxic symptoms developed during labor or in the puerperium. Dilatation was complete within 8 hours.

Shortly after rupture of the membranes the head appeared. The perineum seemed adequately stretched. Before the greatest circumference of the head had emerged, the elbow and a portion of the upper and forearm appeared emerging from the anus. As the posterior shoulder progressed, the protruding elbow receded and finally disappeared completely, being finally delivered through the vagina smeared with feces. The placenta was delivered without difficulty.

Inspection showed the perineum and anal sphincter intact, but with a communication, measuring two fingerbreadths in width, between the posterior vaginal wall and the rectum, about 3 to 4 cm. above the vaginal introitus. The fistula was repaired after a third degree perineal laceration was made by splitting the sphincteric musculature. The tissues seemed extremely friable. Healing occurred by primary intention.

A review of the literature revealed 2 almost identical cases, with the difference that in 1 case not the elbow but the entire forearm protruded from the rectum. Analogous cases have been reported in breech presentations. In some cases syphilitic strictures have been held responsible. Pressure erosion has also been incriminated, but would be plausible only in cases of greatly protracted labor. Hyperextension of the posterior vaginal wall has also been considered as playing a part. However, in the present instance the infant was of normal weight and the delivery spontaneous, so that such a factor could hardly have been involved. Among contributing factors mentioned by various writers are a narrow vagina, edema of the labia and septum, oversized infants with very hard skulls, and simultaneous presentation of the head with some smaller part. EDITH SCHANCHE MOORE.

Changing Trends in Cesarean Section. ABRAHAM B. TAMIS and JACOB CLAHR. *Am. J. Obst.*, 1948, 56: 700.

In a study of cesarean section at the Morrisania City Hospital, New York, New York, it was noted that while the incidence of this operation had doubled in the last 10 years, the mortality, when compared with the previous 10 years, had decreased from

10.7 to 3.3 per cent. The increased number of cesarean sections occurred mainly in the groups of patients presenting cephalopelvic disproportion and placenta previa.

The reduction in maternal mortality is attributed to the predominant use of the low cervical operation, the routine use of antibiotics, the improved technique of operation, and an attempt to prevent procrastination by proper evaluation of labor at the time of admission. It is believed that a continuation of this policy would bring about a further reduction in the maternal mortality rate without adding to the incidence of cesarean section. JOHN R. WOLFF, M.D.

MISCELLANEOUS

Ureterocystoneostomy Incident to Cesarean Section with Hysterectomy Necessitated by a Rare Form of Fibroma Developing Retrovesically in the Broad Ligament (Uretero-cisto-neostomia nel corso di taglio cesareo demolitore per eccezionale fibroma a sviluppo intralegamentare e retrovescicale). G. DOSSENA. *Ann. ostet. gin.*, 1948, 90: 385.

When the abdomen was opened in this case of cesarean section the tumor was so huge that the anterior surface of the uterus could not be brought up and the living child, which weighed 2,000 gm., had to be removed through the left margin of the uterus. The uterus was then closed, without removal of the placenta, and removed en masse with the tumor. During this removal the juxtavesical portion of the left ureter, lying deep under the lower end of the tumor mass, could not be reached and the whole mass had to be removed blindly because of the hemorrhage under massive clamping of the pelvic tissues. This resulted in the removal of a portion of the lower end of the left ureter several centimeters from the ureterovesical junction. The vesical stump of the ureter was ligated with strong linen, the bladder itself was brought up to the proximal stump, and a direct implantation of the ureter into the cupula of the bladder was done according to the simple invagination method described by Stoeckel. This was done entirely with absorbable sutures.

Two laterally placed sutures in the adventitia of the ureteral stump, about 2 cm. from its lower end, were used to fasten the ureteral stump extramucosally into an ample incision through the bladder cupula. The end of the stump was cut on a slant in order to make the opening larger. A few extramucosal fine sutures of catgut were then added to invaginate the stump further into the bladder lumen and to seal the edges of the bladder incision about the ureter, and the bladder itself was fixed by a couple of extramucosal sutures to the side wall of the pelvis.

The whole pelvis was carefully peritonealized and closed, a Mikulicz drain being left in place for 8 days, and then a small drain was allowed to remain for a few days more. An abundance of antiperitonitic serum was left in the abdominal cavity and for the following week sulfonamides were given intravenously and urinary disinfectants orally. A Pezzer catheter was left in the urethra and bloody urine was discharged for 12 hours and turbid urine for 2 weeks longer.

On the twenty-fourth postoperative day descending pyelography disclosed filling of both kidney pelves and a dilated and tortuous ureter on the right side, but the left ureter was straight and of normal diameter. On the thirtieth postoperative day descending pyelography was done with pneumatic compression of the abdomen. This test again disclosed rapid emptying of the kidney pelvis and plainly depicted both ureteral openings into the bladder. On the thirty-fifth day cystoscopy revealed, at the site of implantation, the ureterovesical orifice in the form of a transverse fissure with edematous borders and at each end a patch of yellowish exudation (fixation sutures), but no evidence of necrosis. From this fissure appeared rhythmic ejaculations of urine.

The patient was last seen 3 months after the operation and reported that he had no urinary complaints.

The author believes that of all methods of implantation of the ureter the one here described should be given preference. Success, however, presupposes an aseptic urinary tract and that the ureteral dehiscence is not located higher up than 12 cm. above the ureterovesical junction.

In the following discussion, SILVA tells of an operation in an old case of pelvic infection in which the greatest difficulty was experienced in mobilizing the bladder sufficiently to bring it close enough to the ureter; this is indispensable in order to accomplish the implantation without subsequent traction on the point of implantation. Nevertheless, the results were good. Twenty days after operation descending pyelography disclosed a dilatation and tortuosity of the upper third of the ureter, but the author thinks that this was present before the operation. Here again cystoscopy disclosed a perfectly healed stoma emitting rhythmic jets of urine.

JOHN W. BRENNAN, M.D.

GENITOURINARY SURGERY

ADRENAL, KIDNEY, AND URETER

Adrenal Cortical Carcinoma. ZACHARY R. COTTLER. *J. Urol.*, Balt., 1948, 60: 363.

The nonhormonal type of adrenal malignancy is usually discovered in its late stages when it becomes manifest by the presence of a mass, vague pain, malaise, and by signs and symptoms of metastasis in other organs. The diagnosis has been greatly aided by the technique of perirenal air injection, as described by Cahill and Mencher.

The treatment of the nonhormonal type of malignancies has been surgical extirpation, when possible, followed by high voltage irradiation to the operative site and to metastases, as they develop. The prognosis is poor, because the lesions often attain large size and metastasize before presenting any symptoms.

The author presents the case of a 50 year old woman who entered the Jewish Hospital of Brooklyn, New York, complaining of falling of the womb. There was no history of urinary disturbance. A large hard mass filled the entire right side and flank. The blood pressure ranged around 250/140 during the preoperative period. X-ray studies, including intravenous urography and a barium enema, showed evidence of extrinsic pressure. Upon operation, the tumor was found to reach from the diaphragm to the loin, with adherence to the kidney. It was removed. Microscopic study revealed an adenocarcinoma of the adrenal gland.

The patient received 10,000 roentgens of radiation therapy. When she was found to have a recurrent mass in the abdomen, another course of 4,000 roentgens was given. Metastasis to the para-aortic region of the chest was discovered 39 months after operation. At the date of the report, the patient had attained 5 years of postoperative observation and is considered in fairly good general condition with a blood pressure which averages 120/80. The metastases have remained unchanged.

The author believes that renal ischemia was the cause of a Goldblatt phenomenon, which accounted for the hypertension. JOSEPH E. MAURER, M.D.

Congenital Absence of One Kidney. K. M. BOWDEN. *Med. J. Australia*, 1948, 2: 293.

The author calls attention to the incorrect statement that the corresponding suprarenal gland is always absent in congenital absence of one kidney. This statement is believed to be challengeable on several grounds.

The kidney embryologically has a double origin. From the wolffian duct an outgrowth occurs which eventually gives rise to the ureter, renal pelvis, calyces, and the straight collecting tubules. As the ureteric bud is developing, the metanephros appears and covers the growing end of this bud; this eventually gives rise to the remainder of the kidney. The suprarenal gland likewise has a double origin, but one that is quite independent of the developing kidney. The medulla is intimately related to the sympathetic nervous system. The cortex is of mesodermal origin and appears as a ridge close to the wolffian body. On embryological grounds, therefore, there is no reason why the corresponding suprarenal gland should be absent when there is congenital absence of one kidney.

Congenital absence of one kidney is usually due to complete arrested development of the ureteric bud from the wolffian duct. There is usually no trace of the ureter and the portion of the trigone on that side is undeveloped. The reports of the incidence of this condition vary widely, from 1 case in 1,000 to 1 in 2,500 individuals.

The author presents 2 case histories of patients with a congenital absence of one kidney, and in whom both suprarenal glands were present.

ROBERT O. BEADLES, M.D.

Aneurysm of Renal Artery. CHARLES PIERRE MATHÉ. *J. Urol.*, Balt., 1948, 60: 543.

Aneurysm of the renal artery is rare. The present report of 5 cases brings the grand total to 86 cases. In 1932 the author reported a case of aneurysm of the renal artery and reviewed the literature. Since that time he has treated 5 additional patients. The author reports these 5 cases in detail.

The first case was especially interesting inasmuch as he found, on exposing the pedicle, that the renal artery had divided into inferior, middle, and superior branches. On the superior branch a saccular aneurysm measuring 1.5 cm. in diameter was encountered. The posterior surface of the aneurysm was densely adherent to a large renal vein. This was carefully dissected free, and the superior branch of the renal artery was doubly ligated below and above the aneurysm with No. 2 catgut. The aneurysm was then extirpated without sacrificing the kidney. The author's case is the second one of its kind in the history of kidney surgery.

Four other cases were also reviewed. In 2 of these, the aneurysms were treated by nephrectomy. In the third case the aneurysm occurred in a ptotic kidney, and sclerosis resulting from the healing process after fixation of the kidney apparently reinforced the defect in the arterial wall, inasmuch as the patient has had no further trouble during the 8 years which have elapsed since operation.

For a detailed description of this condition, reference is made to a communication by the author, published in 1932. Articles which have subsequently appeared reveal many pertinent facts. Trauma is no longer considered to be important as a factor in the etiology of aneurysm. It is believed that most aneurysms are due to the same degenerative changes

noted in the walls of the blood vessels that give rise to aneurysms elsewhere in the body, among which arteriosclerosis and syphilis play a dominant role.

Most authors state that this lesion is asymptomatic. However, a review of the symptoms recorded in published cases reveals that pain is more or less constant. In the author's 5 cases pain was a dominant factor. He believes that when a patient suffers from intractable pain in the kidney area, one should not hesitate to carry out operation for the purpose of performing renal sympathectomy, and at the same time the renal artery and its branches should be explored for the presence of aneurysm.

The broken wreathlike shadow which is denser at its periphery is considered diagnostic. Brady and Hanten believe that when there is a defect in the calcified annular ring due to the connection between the aneurysm and the artery, the differential diagnosis between aneurysm of the renal artery and other calcifications in and about the kidney can be positively made. Furthermore, laminograms taken in conjunction with an excretory urogram will reveal the shadow to be delineated in the same plane as the kidney. Unfortunately, many aneurysms are not calcified and cast no shadow. Arteriography should be more commonly employed as a diagnostic method, particularly in patients presenting persistent renal pain in whom renal sympathectomy is contemplated. It gives valuable information concerning the distribution of the renal artery and its branches, and also may reveal the presence of aneurysm.

All authors agree that nephrectomy is the treatment of choice. Mathé emphasizes, however, that when the aneurysm involves one of the branches of the renal artery and the main branch is devoid of atheromatous changes, the aneurysmal sac can be resected without sacrificing the kidney. In the occasional case presenting a small fusiform aneurysm associated with other renal disease, such as ptosis or hydronephrosis, the kidney lesion can be corrected without sacrificing the organ. The fibrosis that has taken place during healing can be relied on to reinforce the defect in the arterial wall.

ROBERT O. BEADLES, M.D.

Renal Tuberculosis in the Child (La tubercolosi renale nei bambini). GIORGIODI MAIO. *Urologia*, 1948, 15: 262.

Two thousand autopsies done on children at the Ospedale Maggiore at Milan, Italy disclose that about 3.76 per cent died of miliary tuberculosis. About half of these exhibited renal tuberculosis in the first year of life. The lesions were unilateral in 7.5 per cent. Unilateral lesions were more frequent from the fifth to the twelfth year and were located usually in the medullary and papillary regions. Vesical lesions were observed in a third of these cases but always after the tenth year. There was only 1 case of concurrent involvement of the testicle, epididymis, and seminal vesicles, in a boy 13 years of age.

In addition to the autopsy material, there are reported 4 cases of surgical renal tuberculosis diagnosed clinically. This number, when compared with the cases of congenital malformation and renal lithiasis, comprises 12.5 per cent of the whole and occupies third place. Surgical renal tuberculosis occurred more frequently in the female and predominantly in the left kidney. The lesion was always ulcerocavernous in character and in 1 case was associated with multiple renal calculi. In the latter case the tuberculous kidney was successfully removed; however, the patient died of anuria before the stone in the other kidney could be removed. In the case of another child the parents refused operation. In the remaining 2 cases the kidney was successfully removed with disappearance of all symptoms.

Search for the tubercle bacillus should be carried out in all children with frequency or urinary incontinence, those exhibiting a pyuria or hematuria, or in those with an intermittent or persistent pyelitis or cystitis, even when the colon bacillus or other common source of infection is established. A search should be made for the bacillus of Koch even in the presence of a roentgenologically diagnosed renal lithiasis. The search is particularly important in the presence of a ureterohydropyonephrosis on an apparent or sure congenital basis, since in the presence of tubercle bacilli the ureter must also be removed together with the kidney.

Once the tubercle bacillus is established in the urinary examination, the establishment of the unilateral nature of the lesion should be accomplished by means of descending pyelography, chromocystoscopy, and ureteral catheterization of the supposed healthy kidney. If Koch's bacillus is found in the urine from this supposedly healthy kidney the diseased kidney may perhaps be removed, provided that its partner exhibit good function and absence of pus. Operation in these cases requires good surgical judgment; nevertheless, the removal of an ulcerocavernous lesion in the diseased kidney relieves the organism of a source of tuberculous bacilli and of toxins and renders spontaneous cure of the other kidney more easy. If the lesion in this kidney also has reached the ulcerocavernous stage such a kidney appears to be incurable with present day methods.

Another argument for nephrectomy in these infants arises from the fact that the urine of these children is a potent source of infection to others, particularly other children and the family, and the younger the child, the greater the danger.

Close co-operation between the pediatrician and the urologic surgeon is needed to get these children under the surgeon's care early and to overcome the reluctance of the parents to have anything done.

JOHN W. BRENNAN, M.D.

Anthrax of the Kidney. Eight New Personal Observations (Antrax del riñon. A proposito de 8 nuevas observaciones personales). RICARDO ERCOLE. *Rev. argent. urol.*, 1948, 17: 7.

Observations of 12 patients with anthrax of the kidney are reported by the author. Four of them had been published previously.

Anthrax of the kidney is not such a rare condition as is generally assumed. As a rule, the condition has a tendency to spread toward the perirenal tissues and not toward the renal pelvis. In a relatively large percentage of cases a perirenal phlegmon results. Because of the fact that pyonephritis occurs only exceptionally in the course of anthrax, urinary findings are usually negative.

The past history may be suggestive of anthrax. The customary posterior location of the perirenal phlegmon produces a contracture of the corresponding muscles, an intensive pain, and immobilization and abnormal elevation of the involved side of the diaphragm. A pleural reaction may develop. In the scout film of the abdomen the absence of the shadow of the psoas muscle is conspicuous; there may be a lordosis of the spinal column and a shadow produced by the perirenal mass. An excretory urogram may render great aid in the diagnosis. However, it should be remembered that the pyelographic image of anthrax of the kidney may be similar to that of a febrile cancer of the same organ. Ascending pyelography is of lesser value.

The proper treatment consists of an enucleation of the involved area. A cure can be obtained in this manner in early periods of evolution of the condition. The conservative surgical procedure should be supplemented by the administration of antibiotics, especially penicillin. Nephrectomy should be reserved for far advanced cases in which nearly the entire organ is involved in the suppurative process.

JOSEPH K. NARAT, M.D.

Injury of the Vena Cava During Nephrectomy (Herida de la vena cava durante la nefrectomia). A. PUIGVERT. *Arch. espan. urol.*, 1948, 5: 66.

Injury of the vena cava is one of the most serious accidents associated with renal surgery. Many outstanding surgeons have given especial consideration to this complication, which demands immediate, quick action, clear judgment, and positive solution. The inundation of the entire abdominal cavity with blood is surprisingly rapid and can lead to considerable confusion with serious consequences before the source of the hemorrhage is identified.

Two cases are reported in which the vena cava was injured during the dissection of dense adhesions about the kidney and ureter. Digital tamponade quickly arrested the active bleeding, and the injury to the vena cava was located after suction removal of the blood. Two forceps forming a "V" blocked off the injury and in one instance a free ligature sufficiently closed the defect, whereas in the other case continuous suture with a needle was required. On repair of the vein, nephrectomy was completed.

STEPHEN A. ZIEMAN, M.D.

Surgical Intervention in Ureteral Calculi (La intervencion quirurgica en los calculos del ureter). PEDRO CIFUENTES. *Arch. espan. urol.*, 1948, 5: 1.

The author reports the removal of ureteral calculi by the lumbar approach (28 cases), the lateral iliopelvic approach (30 cases), and the middle hypogastric approach for low pelvic ureteral stone (14 cases), and by simultaneous removal of the kidney because of complicating kidney stones and kidney destruction (15 cases).

The ureteral stones varied from 0.5 to 3 cm. in diameter, whereas in 1 instance a stone in the pelvic ureter measured 3 by 5 centimeters. Simple roentgenographs were sufficient in most instances to identify and locate the stones. In other cases cystoscopy and ureteral catheterization were necessary. The operations, as a rule, were simple except when considerable periureteritis existed, when the stone was in the lower kidney pole, or when the patient was unusually obese.

There was 1 immediate postoperative death attributed to intestinal paralysis; 1 death occurred 2 years after operation, and a third, 5 months from the date of surgery. The latter 2 deaths, however, followed bilateral renal lithiasis.

STEPHEN A. ZIEMAN, M.D.

Transplantation of the Ureters into the Rectosigmoid and Cystectomy. CHARLES C. HIGGINS. *Surg. Clin. N. America*, 1948, 28: 1209.

With the use of modern techniques and follow-up methods, it has been shown that the ureters and kidneys following ureteral transplantation into the rectosigmoid remain in a normal or fairly normal condition over a period of years. The author lists the following indications for this procedure.

Exstrophy of the bladder. The procedure of choice for exstrophy is transplantation of the ureters followed by cystectomy. The operation should be performed during the first year for the following reasons: (1) infants tolerate surgical procedures well; (2) the operative mortality and morbidity are low; (3) as years elapse, recurring attacks of pyelonephritis result in irreparable kidney damage; (4) it is probable that the organisms in the bowel of the infant are less virulent than in older children; (5) early operation permits normal development from the physical and psychological standpoint; (6) as the child grows older, ureteral obstruction develops at the ureterocystic junction and results in dilatation of the ureters, making the operation technically difficult and at times impossible.

Carcinoma of the Bladder. Cystectomy and transplantation of the ureters into the bowel are indicated in the following instances: (1) when extensive single or multiple infiltrating tumors are present; (2) when the carcinoma at the base of the bladder encroaches upon the ureteral orifices or when the vesical sphincter and urethra are so involved that local treatment would destroy the ureteral orifices or cause incontinence; (3) when multiple recurring tumors develop so rapidly that they cannot be controlled by fulguration or irradiation; (4) in the presence of early Grade 3 or Grade 4 neoplasms of the bladder. Neoplasms in this group may be treated by segmental resection which is preferable if the position of the tumor in the bladder favors the operation.

Epispadias. When the defect is so extensive that plastic operations fail and incontinence persists, transplantation of the ureters into the bowel may be advisable.

Tuberculous cystitis. The presence of intolerable bladder symptoms after nephrectomy in unilateral renal tuberculosis may be an indication for a ureteral transplant if the ureter on the normal side shows dilatation with a coexisting early hydronephrosis.

Interstitial cystitis. If conservative treatment is of no avail, transplantation of the ureters into the rectosigmoid may be justified.

Incontinence following transurethral resection. If the incontinence is permanent the patient should not be forced to wear a receptacle inasmuch as relief can be afforded by transplantation of the ureters into the bowel.

Vesicovaginal fistula. In patients in whom the defect is so extensive that it involves the bladder, sphincter, and urethra, and incontinence remains even after closure, transplantation of the ureters may result in complete relief.

In infants the operation for transplantation of the ureters and cystectomy is performed in two stages. The right ureter is first implanted into the bowel; 10 days later the left ureter is transplanted into the rectosigmoid and the exstrophic bladder is removed.

In adults, the general condition of the patient, the presence or absence of renal infection, and the caliber of the ureters influence the decision as to whether both ureters should be transplanted simultaneously or whether unilateral transplantation is preferable. Generally, the author prefers to transplant the right ureter in one stage, and then, 7 to 10 days later, he transplants the left ureter and performs the cystectomy.

The technique of the operation is described in detail, and the exact preoperative and postoperative care and orders are outlined, as the author states that no stage of the operation is more important than the initial preparation of the patient. The author concludes that adequate preoperative preparation, postoperative care, and the refinements in surgical technique have reduced the mortality from this procedure to a point where there should be no hesitancy in recommending the operation in selected cases.

The patients are comfortable, have complete control of the urine, and may lead a normal life.

Dilatation of the ureters, hydronephrosis, and renal sepsis may be avoided by careful attention to the technical details of the operation.

Radical operation is recommended for those cases of carcinoma of the bladder in which conservative treatment carries a high morbidity and little prospect of cure. ROBERT O. BEADLES, M.D.

Surgery of Upper Urinary Tract. WILLIAM J. BAKER. *J. Urol.*, Balt., 1948, 60: 197.

Modern urology emphasizes the reasonable salvage of the urinary tract whenever it is possible. Conservative renal surgery is illustrated in the plastic operations on the renal pelvis and its junction with the ureter to correct hydronephrosis. An attempt to provide adequate renal drainage is always justified, if the age of the patient and the condition of the renal parenchyma fulfill their part of the equation. It is very difficult, however, to predict how much repair of renal tissue will take place or how much function will return after the relief of obstruction has been accomplished. The end results of bilateral pelvioplasty are at times quite gratifying. The author's second case demonstrated that bilateral plastic operations on the ureteropelvic junctions in a 52 year old woman conserved renal tissue and would no doubt prolong her life for many years.

The mediocre results of conservatism in the management of hydronephrosis associated with aberrant renal vessels was discussed by the author. This was especially noted in those instances in which the vessels were cut and no corrective procedure was done at the ureteropelvic junction. A pelvioplasty as well as the severance of obstructing vessels and bands at the ureteropelvic junction is necessary for the best postoperative results.

Conservative management of unilateral ureterohydronephrosis requires consideration of the degree of destruction of the renal tissue, the duration of the obstruction, the cause of the obstruction, the age of the patient, and the existing blood pressure. Experimental work has shown that an obstruction in the ureter that has existed over 90 days produces irreversible renal damage, and a proper renal counterbalance cannot be expected after the obstruction has been relieved. One of the author's cases illustrated that a pelvioplasty of a long-standing unilateral advanced hydronephrosis associated with hypertension, even in a 36 year old woman, was contraindicated. In this case, a nephrectomy proved to be a conservative procedure. Ormand directed attention to the many nephrectomies following unsuccessful plastic operations for hydronephrosis, while Moore and Walters stated that unsatisfactory results can be expected in 20 per cent of plastic operations on the kidney pelvis.

Better results are to be expected if ureteral splinting and nephrostomy drainage can be prolonged from 3 to 6 weeks. Many patients obtain symptomatic relief after a plastic operation at the ureteropelvic junction without much change in the anatomical contour of the pelvis. The symptomatic relief may come from the nephroureterolysis while the same procedure disturbs the nerve supply enough to prevent return of normal or near normal anatomic form.

A stone-bearing calyx, or a hydrocalyx is the principal indication for partial renal resection or calycectomy. Many authors have reported series of patients who have had successful partial resection of the kidney heminephrectomy for disease of one calyx or of the pelvis of a double kidney. Heminephrectomy is usually easy when there is a double kidney because the blood supply lends itself to removal of the half of the kidney bearing the disease. The upper half of a double kidney is usually the smaller part of the renal mass and the site of the disease.

Conservatism should play a part in the management of many large bilateral renal calculi. The symptoms, condition of the kidneys, and the age of the patient should help to decide whether these calculi should be surgically removed.

One of the greatest problems in conservative renal surgery concerns the procedure to be followed when the kidney and ureter have been obstructed with moderate sized or large calculi longer than 3 months. The removal of a long-standing calculus obstruction at the ureteropelvic junction or the juxtavesical portion of the ureter will many times be followed by little or no return of anatomical form, and a symptom-producing dilated, infected ureter and kidney remain. Strictures form very rapidly in these ureteral regions in spite of postoperative dilatations. Nephroureterectomy is frequently necessary in many instances in order to obtain a symptom-free patient.

The author presented the case of a patient in whom a ureteral stone had been removed through a ureterotomy. Complete obliteration of the left ureter was observed 2 years after operation. A silent autonephrectomy had developed that was apparently caused by the reaction of the calculus in the lower ureter.

Congenital strictures may present a surgical problem. In a case of stricture of the upper third of the ureter along with hydronephrosis, a left ureteroplasty and nephrostomy with catheter drainage of 6 weeks' duration justified this type of conservative surgery.

Conservative management is often indicated in the treatment of traumatic kidneys. Exploratory operations have been advocated if hematuria is present longer than 24 hours. The clinical picture usually suggests the necessity for operation upon the injured kidney.

Baker used conservative treatment on 2 patients with unilateral pyogenic kidneys. In a boy 11 years of age, he was able to enucleate the pyogenic area from the renal parenchyma. In the second case, a patient 45 years of age recovered his health following the removal of a walnut-sized renal carbuncle.

A complete nephroureterectomy is the procedure used for pedunculated renal tumors. In one of the author's cases, however, he was able to remove a pedunculated papilloma 6 inches in length with the electric cutting needle. The patient's recovery was uneventful. This is not the method of choice, however, in the treatment of all tumors of the ureter.

In summary, the author stated that one should sincerely try to conserve renal tissue, but one cannot always prophesy the degree of success of his efforts. Failures and unfavorable results following surgery may be due to poor understanding of the neuromuscular physiology of the kidney and ureter. Improper estimation of final renal counterbalance may also account for many of the poor results of conservative renal surgery that have to be followed by a subsequent nephrectomy. The added experience of the surgeon and the use of the antibiotics should render conservative renal operations more successful.

CONRAD A. KUEHN, M.D.

BLADDER, URETHRA, AND PENIS

Deformities of the Male Urethra. SIR ARCHIBALD MCINDOE. *Brit. J. Plast. Surg.*, 1948, 1: 29.

The author discusses deformities of the male urethra from the viewpoint of a plastic surgeon. The general principles he stresses are:

1. Anatomical: (a) it must be of adequate caliber; (b) it must not contract to produce a stricture; (c) it must be sufficiently long and elastic; (d) the lining must not be hair-bearing; and (e) there should be a good cosmetic result.

2. Physiological. Throughout the planning of repair the sexual function should be also taken into consideration.

3. Surgical. It is necessary to direct the urinary stream, and usually external urethrostomy is advisable. Hematoma and infection should be guarded against by the use of accurate hemostasis, fine instruments, and atraumatic sutures.

The author then discusses in detail the use of the above principles in the repair of 52 urethras comprising this report. The patients had penile injury (6), penile amputation (3), congenital short urethra (2), epispadias (6), and hypospadias (35).

JOHN A. LOEF, M.D.

The Value of Immediate Urethrography and Immediate Reconstruction of the Urethra Over a Support in Traumatic Ruptures of the Membranaceous and Perineal Urethra (Valeur de l'urétrographie immédiate et de la réfection immédiate de l'urètre sur tuteur, au cours des ruptures traumatiques de l'urètre membraneux et périnéal). L. SABADINI. *J. chir.*, Par., 1948, 64: 420.

Only urethrography is able to furnish information concerning the exact location of a rupture of the urethra and the presence of periurethral injuries, but in the presence of a trauma of the urethra, urethrography has been dogmatically contraindicated because of the danger of embolism or spread of the infection by the contrast medium.

The author employed urethrography in 70 patients with recent ruptures of the membranaceous or prostatic portion of the urethra without untoward effects. He employed a 40 per cent solution of lipiodol, 1 part, and 10 per cent oil, 2 parts, as the contrast medium. The mixture is not only sterile but bactericidal.

Fractures of the pelvis without a lesion of the urethra may provoke a retention of the urine. Negative findings of urethrography in such instances contraindicate surgical intervention. From the medicolegal point of view, visualization of a lesion of the urethra on the x-ray film is of great value. Moreover, clinical examination alone is not enough to detect periurethral lesions or to indicate their intensity. Demonstration of participation of the middle aponeurosis in certain perineal ruptures by urethrography is extremely valuable. In undergoing preliminary cystostomy the author derives great benefit from ascending and retrograde urethrography. No

infection, embolism, or the slightest elevation of temperature has been observed by the author after the employment of this procedure.

The time allowed to lapse between the preliminary cystostomy and urethral repair depends on the site of the injury.

For the repair of a perineobulbar rupture a vertical scrotopreanal incision is made. The hematoma resulting from the tear of the superficial perineal aponeurosis is removed. The bulbocavernous muscles are always found sectioned in a transverse direction. A longitudinal incision is made through these muscles and the corpora spongiosa. All devitalized tissues must be removed. The urethra is reconstructed over a rubber tube, one end of which is pulled out through the cystostomy with a retrograde catheter. In some instances it may be easier to bring out through the perineal wound, by means of a curved clamp, a catheter introduced through the cystostomy. The other end of the tube is brought out through the meatus.

For the repair of a rupture of the membranaceous portion of the urethra, a scrotoanal vertical incision is made and the retromembranoprostatic space is exposed. The pelvic hematoma is removed and the prostatorectal space is exposed. The torn urethra is trimmed and a longitudinal incision is made through the bulbar urethra to provide a better exposure. No debris should be left as it is apt to produce stenosis. The urethra is reconstructed over a rubber tube. The anobulbar raphe is also reconstructed by uniting the bulb with the anterior wall of the anorectum. After the repair of the membranaceous portion, the bulbar urethra is reconstructed with catgut over a rubber tube. No drainage is employed. The author uses a soft rubber tube, 30 cm. long, with a gauge of from 18 to 20, according to the patient's age.

The author advocates repair of the urethra at the earliest date after the injury, preceded by urethrography. If the facilities for the repair are not immediately available, vesical puncture or preferably cystostomy should be done.

After the operation the urethral portion of the rubber tube is pulled out, washed with ether, oiled, and pulled back. No antiseptic solutions are employed for irrigation of the tubing or for injections between the tube and the urethra. The tube is left in place from 3 to 4 weeks, or more, to prevent scar formation. Penicillin is employed routinely. After 3 or 4 weeks the tube is removed at the same time as the vesical drain and is replaced by a Nelaton catheter. Every second day a diathermy treatment is given to soften the scar. As a rule, from 10 to 15 treatments are given. Disruption of the urethra is of no clinical importance because it is followed by complete restitution. JOSEPH K. NARAT, M.D.

Transurethral Resection in Childhood. JOHN L. EMMETT and HENRY F. HELMHOLZ. *J. Urol.*, Balt., 1948, 60: 463.

Urinary stasis, the cause of which is below the level of the ureteropelvic junction, continues to be one of the most difficult problems in pediatric urology. All too often the etiology and pathogenesis of the condition is obscure so that the therapeutic problem is poorly defined. Even when the causative factor is clear-cut, therapeusis may be most difficult to carry out.

The treatment of a few well defined and rather rare obstructive conditions which occur at the ureterovesical junction, such as ureterocele and congenital stenosis, is not considered, but the authors discuss the therapeutic efforts to correct urinary stasis (below the level of the ureteropelvic junction) which are directed toward infravesical conditions (affecting the vesical neck, prostate, and urethra).

The authors have selected all patients at the Mayo Clinic less than 20 years of age on whom a transurethral operation has been done for abnormal conditions at the vesical neck or in the prostatic urethra from October 1, 1941 through December 31, 1946. They did not include 5 patients in this age group who underwent resection because of a neurogenic bladder caused by transverse myelitis of traumatic, inflammatory, or neoplastic origin. The study concerns 49 patients, of whom 34 were male and 15 female. By means of re-examination of the patients and follow-up letters, recent data concerning the condition of 40 of the 49 were obtained. For the remaining 9 patients the record of the patients at the time of dismissal were used in evaluating the results of the operations.

Urinary stasis in infants and children in which the causative lesion is below the level of the ureteropelvic junction may often be relieved by transurethral resection of the vesical neck.

Young people who require transurethral resection may be divided into two groups: (1) those who have vesical dysfunction which results from myelodysplasia and spina bifida, and (2) those who have congenital obstruction of the vesical neck.

There are two problems to consider in the group of patients with myelodysplasia and spina bifida: (1) relief of obstruction of the vesical neck and elimination of residual urine (which is essentially the same problem as in cases in which cord bladder results from acquired lesions of the spinal cord), and (2) correction of an incompetent external urethral sphincter. Because of the inability to combat the latter problem, normal vesical function can be re-established in only about 1 of 3 patients of this group.

The patients with congenital obstruction of the vesical neck respond to treatment with transurethral resection in a much more satisfactory manner. In more than 2 of 3 patients normal vesical function can be restored. The ultimate course of these patients depends on the amount of renal damage present. Early diagnosis is therefore important. In the authors' patients, no congenital urethral valves were encountered. The type of obstruction encountered consisted of lobar hypertrophies, bars, contractures of the vesical neck, hyperplasia of the "internal sphincter" and redundant tissue at the vesical neck and "normal-appearing vesical necks."

GENITAL ORGANS

Is the Roentgenological Appearance of the Spine and the Skeleton Always Diagnostic of Osseous Metastasis from Cancer of the Prostate, and from Other Cancers? (L'aspect radiologique du rachis, et du squelette, permet-il de conclure toujours à l'existence de métastases osseuses dans le cancer de la prostate, et dans les autres cancers?) M. GEORGES KUESS. *Mém. Acad. chir.*, Par., 1948, 74: 287.

Fey presented to the Radiological Society on April 30, 1947 the case of a patient who had "ivorization" of the body of the second lumbar vertebra. The type of lesion in the bone permitted him to make a diagnosis of vertebral metastasis from a previously undiagnosed cancer of the prostate. A roentgenogram taken 4 months later under the effect of diethylstilbestrol, showed the body of the second lumbar vertebra to be clear with a return of its osseous structure.

M. Louis Michon reported the case of a man 65 years of age who had been treated by diethylstilbestrol and castration. Radium was applied from September 22 to 26, 1941. This treatment was followed by intense lumbosacral pain that was not relieved by diethylstilbestrol therapy. On August 19, 1945 a bilateral castration was done with total relief of pain within several hours following the operation.

The author described a patient who had been treated with diethylstilbestrol and "gloxines of Rubens-Duval". The patient's urine was clear and he had two or three nocturnal micturitions. Episodes of lumbar pain occurred from time to time. The author described in detail the roentgen findings during this period from August 13, 1945 when the first examination was made until the last roentgenograms were taken on December 27, 1947. The first pictures showed "ivorization" of the entire lumbar column, the vertebra L-1 to L-5, inclusive having a cloudy pagetoid appearance, along with the osseous pelvis and the superior extremities of both femurs. The second roentgen examination, November 10, 1947, showed a similar pagetoid appearance. There was no deformation of the bodies of the vertebrae or the vertebral discs. The third examination, made April 19, 1947, showed about the same condition. The author thought there was an osteoporosis of the lumbar column, the pelvis, and the femurs, associated with a cellular diathesis of cottonlike appearance. The fourth and last examination, made on December 27, 1947, showed the pagetoid appearance not only in the lumbar column but in the entire vertebral column, the entire pelvis, the femurs, the left tibia, and the clavicles, with profound modification in the structure of these bones. This modification was particularly marked in the pelvis and the spine. The lesions probably involved the entire skeleton, but without deformation, however, of the vertebral bodies or the vertebral discs.

From a roentgenological point of view, here was a case in which a diagnosis of cancer of the prostate with neoplastic metastases to the entire lumbar column, the osseous pelvis, and the superior extremity of both femurs, was made in December, 1947. The roentgenological interpretation of the film was given as a more or less pagetoid appearance of the bones with osteoporosis associated with a cellular diathesis. These pictures do not exclude the possibility of osseous metastases absolutely; in fact, they suggest at least the possibility of these metastases. While vertebral, pelvic, and generalized metastases are frequently found in cancer of the prostate, it is the roentgen interpretation of these bone lesions that suggests metastases from silent or semisilent cancer of the prostate.

The author divided the localization of osseous metastases of cancer of the prostate in the spine, and especially in the lumbosacral spine, into three forms:

1. The osteoporotic and osteoclastic form shown by involvement of one or several vertebral bodies. The spreading involvement is shown by progressive bone destruction by the metastases. The intervertebral disc is not involved, however.

2. The osteoplastic form is more frequently encountered than the osteoporotic and osteoclastic. This form consists of a double process, one of osseous condensation and the other of proliferation of new bone. This results in osseous deformation, rarefaction, and osseous destruction with decalcification. The two processes are manifested by clouding and "marbling," suggestive again of the appearance of the bone in Paget's disease.

3. The third form is that of condensation. It is characterized by calcification of the vertebral body with metallike appearance or "ivorization" of the vertebrae. The observer is surprised by the absolute opacity of the body of the vertebrae, there being no trace of the usual osseous structure.

There is no typical roentgenological or graphic appearance of the vertebrae that can be considered to be characteristic of cancer of the vertebrae, and especially that due to cancer of the prostate. Kuess draws attention to the fact that the same osteoporotic and osteoclastic lesions may be due to Kummel-Verneuil decalcifications following fractures, trauma to the spine, spondylolisthesis, epiphysitis, and certain forms of Pott's disease, along with various generalized osseous infections.

In the condensation form, the dark or black vertebra, or ivorylike vertebra shows progressive evolution of defense and hyperosteogenesis reacting from diverse causes. Vertebral ivorization is found in other osteopathies as well.

In short, one is able to encounter diseases of the hemopoietic system or reticuloendothelial system, myeloid leucemia, Sternberg-Hodgkin's disease, and other diseases of the same origin that present roentgen findings more or less frequently found in the diffuse type of Paget's disease. Of the three forms of roentgenological spinal metastases the intermediate or transitional forms are hard to classify.

The author stated that from his study he concludes that there was no characteristic picture of spinal metastases, for many diseases give the same roentgenological picture. This makes the differential

roentgen diagnosis of metastases very difficult and uncertain.

The author believes that the roentgenological findings have sometimes been interpreted as being characteristic of the absence of metastases when they show bone changes secondary to disturbances of calcium metabolism and especially to modifications of the phosphatase rate in old men who most often are affected with cancer of the prostate.

The elevation of the phosphatase is also observed in Paget's disease, Recklinghausen's disease, and in osseous rickets; therefore it is an error to use the term "metastases" with regard to some bone changes in the presence of a prostatic neoplasm as they are simple changes due to modification of the phosphatase rate.

Kuess demanded that all of his colleagues make biopsies at autopsy and anatomical pathological examination of the vertebrae, which they have recognized roentgenologically as being the site of cancerous metastases.

In the ensuing discussion Wolfromm stated that he agreed with the author that without biopsies, one is not able to make a definite diagnosis of metastases from cancer of the prostate. He further observed that some testicles have been removed with only temporary relief of pain. One is not able, he stated, to establish a relationship between osseous alteration and the production of acid phosphatase in cancer of the prostate. The phosphatase is not able to construct or destroy bone, for this role is delegated to other hormones.

In Paget's disease, presenting osseous tumors, nonprostatic in origin, the acid phosphatase is not increased, but the alkaline phosphatase is. The amount of phosphatase reveals a paradox. The phosphatase is normal in patients with gross metastases from cancer of the prostate, yet the prostate may be filled with acid phosphatase. Wolfromm suggested that it would be advisable to follow the clinical course of the patient by repeated acid and alkaline phosphatase determinations of the blood; however, this would be difficult because of the burden placed upon hospital personnel and the expense to the patient of tests that would only assist in diagnosis and not in therapy. He regretted that it was not always possible to obtain biopsies from the suspected zone.

In continuing the discussion, SORREL emphasized the difficulty of interpretation of roentgenograms of vertebral cancer. To make a biopsy is not always practical, and it is almost impossible from the roentgenological and clinical signs alone to say that an osseous lesion is the site of a neoplastic metastasis. He described the case of a 44 year old patient with an old diagnosis of paraplegia due to Pott's disease which was in reality a paraplegia due to vertebral cancer secondary to cancer of the breast that had previously been undiagnosed. The roentgenogram of the skeleton showed sites of cancer in all of the bones except the more peripheral ones, such as in the hands, forearms, lower legs, and feet. Death followed an acute pulmonary infection. The autopsy confirmed the existence of osseous lesions; a great number were found in the skin and liver and all were discovered to be from the cancer of the breast.

In concluding the discussion, the author confirmed the suggestion of WOLFROMM that biopsies and autopsies be obtained that would permit recognition or deny the metastatic character of the osseous alteration shown by roentgenography. He suggested that roentgenograms be taken of the vertebral column after autopsy, or a biopsy made if possible, and anatomic and pathologic examination of the lesions be made. Then a comparison of the known metastases with the evidence obtained by roentgenography in doubtful cases should be made in order to have more information about the roentgenological appearance in the living patient. It is easy, the author stated, to demand biopsies and autopsies, but in practice it is quite difficult to make these examinations. The prognosis depends upon the therapeutic decision above all, and this in turn very often depends upon the roentgenologic interpretation of the metastatic or other bone lesions.

The author cited a case of Cosasesco of Bucharest. This case was that of a woman having osseous lesions that could either be due to hyperparathyroidism or be metastases from epithelioma of the breast. The roentgen findings were considered to be the same in both diseases, and it was not possible to decide the diagnosis roentgenologically. The author removed the enlargement of the thyroid gland on the right side, and thus removed the cause of the hyperparathyroidism. He noted postoperative improvement in the condition of the bone, and deducted from this finding that the patient had a hyperparathyroidism rather than metastases from cancer of the breast. This patient illustrated the author's view that roentgen examination alone is not sufficient to decide the proper diagnosis, the prognosis, and the best therapeutic approach. CONRAD A. KUEHN, M.D.

Cryptorchidism. LLOYD G. LEWIS. *J. Urol.*, Balt., 1948, 60: 345.

As noted by Felix and other embryologists, there is no internal descent of the testis.

The function of the cremaster muscle in drawing the testis through the inguinal canal, as described by John Hunter and by Curling, is evident from experimental observations on young rats. When the genitofemoral nerve is divided before testicular descent has taken place, the gland remains in the abdomen. When the innervation of the cremaster is divided after descent of the testis, that gonad cannot be drawn up into the abdomen like its normally innervated mate. When the testis has been manually replaced in the abdomen after section of the genitofemoral nerve, it remains in the abdomen unless manually expressed.

Descent into the scrotal sac depends on normal development of the scrotum.

Hormone therapy may bring about descent of the testis by activation of the normal mechanism, pro-

vided no anatomical or pathological condition prevents transit through the inguinal canal.

Anterior pituitarylike hormones will advance puberty in boys nearing that phase of their normal development. The use of gonadotropic hormones will hasten descent of the testis only in those patients whose testes would normally descend at puberty.

The use of hormones at or shortly before puberty may prevent unnecessary surgery.

If the testis does not descend after the use of 30,000 rat units of anterior pituitarylike substance in a dosage of 500 rat units twice or three times a week, surgery is indicated without delay.

The Torek operation, or the traction suture method of orchiopexy, apparently gives the best anatomical results.

Spermatogenesis following orchiopexy depends upon preservation of the internal spermatic vessels.

Division of the sheath of the internal spermatic vessels and straightening of their course under vision to allow placement of the testis in the scrotum deserves our serious consideration.

JOHN A. LOEF, M.D.

Malignant Tumors of the Testes (Tumores malignos del testiculo). ALBERTO RAHAUSEN. *Bol. Soc. cir. Chile*, 1947, 25: 203.

Of 73 malignant tumors of the testes observed by the author, 74 per cent were seminomas.

The author has observed that seminomas are radiosensitive and that treatment can be given in such a manner that it does not harm the organism. It is essential to irradiate the regions in which glandular metastases are most frequently encountered.

In 45.2 per cent of the author's material the tumor was found in the third decade of life, in 30 per cent it was noticed in the second decade, and in 19.1 per cent in the fourth decade. The oldest patient was 57 years and the youngest 2 years and 8 months of age. In 54.8 per cent of the patients the tumor was located in the right, and in 45.2 per cent in the left testicle.

In 2 of 6 patients with undescended testicles the tumor was discovered in the testis which was in its normal position; in 1 instance the tumor affected the ectopic organ; in 2 patients the tumor was located in organs which had been brought into the scrotum a few years previously by means of an operation; finally, in 1 case the tumor developed in a testis which slipped into the abdomen after a herniorrhaphy. In only 6.8 per cent of the entire material was a seminoma located in an ectopic organ. In 35 per cent of the cases a trauma was recorded in the past history, but the author does not attribute great importance to this factor because in many instances only a minor injury preceded the development of the tumor and the interval between the trauma and the discovery of the tumor was rather long.

The period of evolution of a seminoma is relatively short. Increase in size of the affected organ is usually the first sign. The pain has no characteristic features. At the time of examination no metastases were detectable in 30 per cent of the cases.

The most frequent sites of metastases are the ilioinguinal and preaortic regions of the abdomen, also the mediastinum and the left supraclavicular region.

The author prefers an aspiration biopsy to obtaining a specimen by means of an incision.

As to the diagnostic value of the Aschheim-Zondek reaction, a positive finding is suggestive of a malignant tumor; if a positive reaction is obtained after extirpation of the tumor, the existence of a metastasis should be suspected. On the other hand, a negative reaction does not exclude the existence of a seminoma.

After the establishment of the diagnosis of a seminoma, from 1,000 to 1,500 roentgens should be applied to the involved organ. After this preliminary irradiation the organ should be removed and the common sites of glandular metastases should be subjected to x-ray therapy.

Of 60 patients treated by the author in this manner, 26.6 per cent were cured.

JOSEPH K. NARAT, M.D.

MISCELLANEOUS

Genitourinary Injuries. JOHN B. WEAR. *J. Urol.*, Balt., 1948, 60: 280.

A discussion of trauma to the genitourinary tract cannot follow a fixed pattern of general statements because the cause and extent of the injury must always be considered. It is difficult for the surgeon to determine the extent of the injury. In civil life the extent of the injury is usually determined by how people in that community work and play. In military life the same types of injuries may occur but, in addition, penetrating wounds from missiles of all sorts as well as an extreme degree of tissue loss may involve more than one organ.

The kidney is not often injured in either civil or military life. Because of its location, it is well protected from all types of injury, and the same position makes it possible for the kidney to recover without surgery in most cases. The mere fact that blood appears in the urine and a mass develops in the side does not call for immediate operation. Grave injury may occur without hematuria and without a lumbar mass, but pain is usually a predominant symptom in these cases. In establishing the extent of the renal injury, the retrograde pyelogram, the exploratory operation, or clinical judgment based upon observation with the intravenous urogram may or may not give information that is desired for the proper management of the case.

Case 1 was chosen by the author to suggest that even though the patient had an apparently mild injury without loss of normal contour of the kidney, examination demonstrated that 5 months later the function of the injured kidney had been so reduced that only a faint trace of diodrast was seen in the 20 minute film.

In Case 2 the patient had a severe injury to the kidney but recovered from the trauma without surgery.

Case 3 was that of an 18 year old sailor who fell while jumping over a fence. He was kept under observation because of hematuria, and a large tender mass developed in the abdomen. The urine was free from blood in 5 days, but he developed a secondary hemorrhage on the twelfth day which necessitated an exploratory operation. This case demonstrated the value of bed rest in conservative treatment. Secondary hemorrhage always suggests the possibility of renal injury, and when it does occur it is usually serious and demands immediate surgical treatment.

An 18 year old boy fell and struck the right side of the abdomen on a post. Subsequent examination revealed a large hydronephrosis containing 450 c.c. of urine. At the time of injury the hydronephrotic sac had ruptured. Recovery was uneventful following nephrectomy.

In the last case, a 12 year old boy suffered an injury in which the ureter had been torn from the pelvis. On operation, it was found that the kidney was surrounded by dense adhesions. Hydronephrotic kidneys are prone to injury, and early operation is usually indicated.

The author presented 5 cases of bladder and urethral injuries. The treatment in this type of case is usually clearly indicated. The results depend upon the extent of the injury, the first treatment given and the time required for definitive treatment. The drainage and diversion of the urinary stream is of primary consideration. When associated organs are injured, their repair takes precedence over the urinary tract injury after diversion of the urinary stream has been established.

In Case 6 a marine was injured by a machine gun bullet entering his right thigh. The bullet had traversed the prostate near the bladder neck. The treatment in this case consisted of retrograde dilatation of the urethra through the previously established cystotomy. The balloon of the catheter was held in place against the internal vesical orifice by light traction. The patient was able to void normally 3 weeks later when the catheter was removed.

Case 7 was that of a naval officer who had suffered a 2 inch laceration of the bladder wall. The treatment in this case was a suprapubic cystotomy followed by a subsequent urethral dilatation.

Case 8 was that of a sailor who had suffered multiple pelvic fractures. A suprapubic cystotomy revealed a laceration of the right side of the bladder. The treatment consisted of evacuation of a considerable quantity of blood and urine and maintaining the catheter drainage.

Case 9 was that of a man who was hospitalized several months following a rifle shot that entered the abdomen over the bladder with its point of exit through the right buttock. Urine drained from this tract. The first operative procedures were laparotomy, indwelling catheter and right nephrectomy. The bullet had severed the right ureter as it left the bladder. A suprapubic cystotomy revealed that the right bladder wall was adherent to the pelvic bone. This area of the bladder was resected. The bladder was closed and the adherent tissue was then removed with a periosteal elevator.

The final case was that of a marine who had been shot in the perineum by a rifle bullet. Colostomy and suprapubic cystotomy were done in the forward area. Four months later the urethra was exposed and found to be completely severed just in front of the urogenital diaphragm. The scar tissue was cut away and the ends anastomosed over a urethral catheter. Recovery was uneventful. Two weeks later the colostomy was closed, and one week after that the suprapubic tube was removed. He was unable to void, but he was instructed to have periodic urethral dilatations. This case illustrated the management of a combined injury to the bladder and bowel.

The author summarizes the paper as follows: (1) even moderate renal trauma may cause loss of function, and repeated intravenous urograms several months after the injury are desirable; (2) after severe injury of the kidney, it will frequently recover without surgery and without evidence of permanent damage, but secondary hemorrhage from too early ambulation requires immediate surgery; (3) lack of blood in the urine does not necessarily mean that the kidney is intact, and evidence of pelvic injury demands early surgery; (4) late surgery in kidney wounds usually results in nephrectomy; (5) in bladder wounds, immediate drainage is imperative; (6) when associated structures are injured, their care has precedence after bladder drainage; (7) late urethral repair means morbidity and difficult surgery.

CONRAD A. KUEHN, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS

CONDITIONS OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Meniscus Malformations as the Cause of Snapping of the Knee Joint (Meniscusmissbildungen als eine Ursache des Kniegelenksschnellens). ARNOLD SONNENSCHEIN. *Helvet. chir. acta*, 1948, 15: 218.

Meniscus malformations occur in two forms: as a disc which represents an ontogenetically and phylogenetically older stage, and as a ganglion which is a cystically degenerated meniscus. Such menisci cannot fulfill their normal function as mobile cartilaginous sockets, but cause the phenomenon of knee joint snapping during flexion and extension of the joint. The author reports the case of 11 persons who were operated upon between the ages of 15 and 38 years.

The malformations were found only in the lateral meniscus, even in 3 patients in whom both knees were involved. Although the defects were already present at birth, they did not cause disturbances during childhood except in cases in which the size or form of the meniscus greatly altered its relations with the condyle. This was the finding in a child of 18 months. Usually, the disturbances appeared in youth or, at the latest, about the time of the end of growth in cases of disc meniscus, and at a later age in cases of ganglion meniscus, the cysts of which developed gradually under the stimulation of mechanical damage. Subjective symptoms predominated over motility disturbances in cases of ganglion, while disc meniscus caused a painless impediment to movement. The first disturbances were often reported in connection with an injury; although trauma has no etiologic significance in the disorder, it can influence the appearance of symptoms and it may play a part in the origin of the cysts.

The lining of the cysts consists of modified connective tissue cells which present a morphologic resemblance to those of the synovial accessory organs; older cysts with a thin internal wall and fibrous thickened capsule show a similarity in structure with the joint capsule.

In the first 4 patients the extirpated menisci presented the form of a tough, thick plate which, in 1 patient, was practically square and had a diameter of 4 to 5 cm. The plates were 8 mm. thick and were flat except for some knobby swellings on their borders. These menisci were incapable of playing their role of a mechanical sliding bed and produced a characteristic snapping of the knee joint during flexion; when the angle of 160 degrees was being passed, there was first an arrest, then a sudden acceleration of the movement while the leg rotated outward or inward, and then rotated back and completed the movement without further disturbance. During extension the same phenomenon occurred but was stronger. Simultaneously, a popping noise was heard and a swelling was observed at the lateral articular space. The jerking could be avoided when traction was exercised on the leg during flexion and extension.

Among the 7 patients with meniscus ganglion, there was only 1 in whom knee joint snapping could be demonstrated regularly and 1 in whom it occurred occasionally.

Treatment consists of extirpation of the lateral meniscus. In cases of cystic degeneration, which often gives the impression of the presence of a single cyst and offers the temptation of puncture, the ganglion is usually polycystic and puncture would fail because it could not reach all the cavities.

RICHARD KEMEL, M.D.

SURGERY OF THE BONES, JOINTS, MUSCLES, TENDONS, ETC.

Tendon Plastic For the Surgical Treatment of Dislocation of the Head of the Radius (Proposta di plastica tendinea per la cura cruenta delle lussazione della testa del radio). VINCENZO LAUDICELLA. *Ann. ital. chir.*, 1948, 25: 157.

The author proposes a new type of surgical treatment for a dislocated head of the radius in which the tendon of the brachialis anticus is used to make a new annular ligament around the head of the radius once the dislocation is reduced.

A curved incision is used, starting on the lateral aspect of the elbow about 4 or 5 cm. above the lateral condyle of the humerus and descending to about 3 or 4 cm. below the head of the radius. The incision is then curved upward and medially to the base of the olecranon. The skin and subcutaneous tissues are then reflected upward and the antibrachial fascia is exposed.

The head of the radius is exposed between the brachioradialis and the brachialis anticus. The insertion of the biceps tendon is retracted medially and the brachialis anticus is isolated. The radial half of the tendon is slit longitudinally, leaving it attached to its insertion. It is then drawn around the neck of the radius under the muscles, and is attached subperiosteally to the ulna on the posterior aspect.

Postoperative immobilization is attained by the use of a cast. This is removed after 2 weeks.

CARLO SCUDERI, M.D.

Results of Open Reduction of "True" Congenital Luxation of the Hip. JACQUES LEVEUF. *J. Bone Surg.*, 1948, 30-A: 875.

In dislocation there is interposition of the soft tissues between the head of the femur and acetabulum. On the other hand, in subluxation interposition of soft tissues never exists. In true luxation established by arthrography, interposition of the soft tissues makes reduction impossible without open operation,

and operation is restricted to cutting away the soft parts which block the acetabulum.

The total number of operations performed was 318, made up of 119 primary open reductions, 96 open reductions with shortening of the femur, and 103 secondary open reductions for luxation after closed treatment. There were 5 deaths. Among the patients under 2 years of age whose hips were operated upon, the ligamentum teres was present in 23 and absent in 12. Among the 23 cases in which the ligamentum was present, epiphysitis developed in 11 (47.8%). Among the 12 cases without the ligamentum, epiphysitis developed in only 2 (16.7%). The results are better when the child is under 3 years of age. The period between second and third birthdays of the patient was selected as the most favorable one for open reduction. After open reduction with shortening of the femur, a fair reduction was obtained in 77 per cent of the patients. Ankylosis, a high degree of coxa vara, and necrosis of the head were the poor results. Operation for bilateral dislocation is advantageous only in children under 6 years of age, and in older patients open reduction is good only for unilateral luxation. The results after open reduction following reluxation and secondary subluxation are not so satisfactory as after primary open reduction, but they are good enough to justify an operation.

RICHARD J. BENNETT, JR., M.D.

On Complications Following Nailing Arthrodesis of the Hip Joint. A. KARLÉN. *Acta orthop. scand.*, 1948, 17: 195.

This analysis is confined to hip arthrodesis for arthritis deformans. At first intra-articular and juxta-articular arthrodeses were performed, but more recently various nailing arthrodeses have been practiced. It was hoped that absolute fixation would both relieve the uncomfortable postoperative symptoms and encourage earlier and firmer bony consolidation.

TABLE I.—RESULTS WITH RESPECT TO ANKYLOSIS IN 94 NAILING ARTHRODESES PERFORMED

Operative method	Number of Operations	Results			
		Bony Ankylosis	Fibrous Ankylosis	No Ankylosis	Deaths
Transarticular nailing arthrodesis	46	14	20	11	1
Intra-articular arthrodesis + transarticular nail (long)	23	16	3	3	1
Intra-articular arthrodesis+transarticular nail (short)	17	9	4	1	3
Osteotomy + intramedullary transarticular nail	8	7	1	—	—
	94	46	28	15	5
		48.0%	29.8%	16%	5.3%

In the nailed group, 90 patients had 95 operations; each of 5 patients had a second operation. At first simple transarticular nailing arthrodesis was used, but frequently there was a gradual slipping of the nail. Then indented or fenestrated nails from 14 to 17 cm. long were used. These nails did not slip, but fracture of the nails occurred. Simple transarticular nailing arthrodesis has been largely discarded for nailing combined with intra-articular arthrodesis. In poor-risk operative patients, a satisfactory procedure for the correction of deformity and arthrodesis is subtrochanteric osteotomy combined with intramedullary transarticular nailing.

The following complications have occurred: death from pulmonary embolism, fat embolism, or circulatory failure in 5 cases; thromboembolism in 9 cases with 2 resulting in death; infection in 1 case resulting in only fibrous ankylosis; peroneal paralysis, 1 case bilateral, which cleared, and 1 case with residual paralysis of the anterior tibial muscle; slipping of the nail in several early cases; fracture of the long nail in at least 8 of 18 cases in which transarticular nailing only was performed; fracture of the femur in 9 cases, 3 being incident to the operative procedure, 3 being the result of trauma, and 3 diagnosed as "insufficiency fractures."

Fracture of the nail was a disturbing factor and occurred in 9 of 27, or 33.3 per cent, of the patients subjected to simple transarticular nailing, and in 3 of 13, or 23.1 per cent, subjected to transarticular nailing combined with intra-articular arthrodesis. This probably occurred because of the shorter postoperative rest in bed. Thus, it might be avoided by longer periods of bed rest, but then the operation would fail in one of its main purposes. Actually, some patients were later kept in bed about 3 months. This gives no advantage over intra-articular and juxta-articular arthrodesis with bone grafting.

In referring to Tables 1 and 2, a comparison of the results of the nailing type of arthrodesis with the

TABLE II.—RESULTS WITH RESPECT TO ANKYLOSIS IN 53 PATIENTS SUBJECTED TO PARTIAL AND TOTAL INTRA-ARTICULAR ARTHRODESIS COMBINED WITH JUXTA-ARTICULAR BONE GRAFTING

Operative method	Number of Operations	Results			
		Bony Ankylosis	Fibrous Ankylosis	No Ankylosis	Deaths
Partial intra-articular arthrodesis with juxta-articular bone grafting:	21	17	2	2	—
Total intra-articular arthrodesis with juxta-articular bone grafting:	32	29	1	1	1[1]
	53	46	3	3	1
		86.8%	5.7%	5.7%	1.8%

[1]Died of bronchopneumonia 2½ months after operation.

results of intra-articular and juxta-articular arthrodesis with bone grafting may be made. From the nailing arthrodesis approximately 50 per cent obtained bony union and 30 per cent, fibrous union. In the earlier series of 53 cases of intra-articular arthrodesis with bone grafting, about 85 per cent of the patients had bony union and 5 per cent fibrous union. The patients with fibrous ankylosis tend to do well on the whole, but their hips are subject to strain; bony union would be more gratifying. It should be noted that the age grouping of the two series was fairly comparable.

The mortality rate is far from discrediting to the earlier operations. Only 1 patient of the 53 died. The average period in bed was 11.4 weeks, but the author believes this can be cut to 10 weeks without adverse effects.

Bony ankylosis did not occur any earlier in the nailed group than in the earlier group. Simple transarticular nailing without resection of sclerotic bone required a longer period for bony union than either the combined nailing or the intra-articular arthrodesis with bone grafting.

While the nailing procedure was undertaken to reduce bed rest, and was followed, in about 3 weeks, by the simple transarticular nailing, the advantage was not too great when the number of fibrous unions and fractured nails are considered. The procedure is a relatively simple one, and it should find application among the elderly in whom minimal surgical trauma is indicated. KENATH H. SPONSEL, M.D.

Treatment of Discrepancies in the Length of the Lower Extremities during Growth (Le traitement des inégalités de longueur des membres inférieurs pendant la croissance). PIERRE BERTRAND and ALBERT TRILLAT. *Rev. orthop.*, Par., 1948, 34: 264.

Differences in leg length may be due to congenital factors (atrophy, with or without skeletal anomalies, dyschondroplasia, exostotic disease, hypertrophy, vascular anomalies, hemarthroses of hemophiliac origin, dislocation of the hip), infections (tuberculosis, osteomyelitis, suppurating arthritis), poliomyelitis, tumors (fibrocystic osteitis, Recklinghausen's neurofibromatosis, chondroma, giant cell tumor), and traumatisms.

Two methods may be used to measure the discrepancies: the clinical and the roentgenologic, which supplement one another. Evaluation of the prospective growth is of first importance for prognosis and treatment. Of the various methods proposed for this purpose, the method of Green and Anderson for poliomyelitis has established averages of sufficient precision.

Before shortening is corrected, it is necessary to eliminate the deformities and deviations which create apparent shortenings, for instance, adduction of the thigh and flexion of the knee or hip. The usefulness of some degree of shortening in certain disorders should not be overlooked.

The inequality in length may become fixed at a certain level after a period of increase, or it may decrease or increase with growth. Therefore, the evolution of the condition should be observed by taking successive measurements to guide its treatment. Various methods to stimulate growth have been tried. They include direct action on the circulation by venous stasis and venous ligation, physical therapeutic agents (diathermy or short waves), action on the lumbar sympathetic by infiltrations or resection, and direct action on the bone by the incorporation of foreign bodies, Ferguson's procedure, and detachment of the periosteum. The methods used to inhibit growth include roentgen therapy, epiphysiodesis, resection of the conjugation cartilage, the procedure of Haas, and vascular operations.

In the present status of the technique of lengthening osteotomies, these operations must be regarded as offering many risks and should be used only in naturally short patients having a short extremity with bones of sufficient diameter, without previous or actual infection and after growth has stopped. In general, shortening operations are functionally less serious and result less frequently in failure. In most cases, the healthy extremity is shortened.

The indications for the various methods vary principally with the age of the children. Up to the age of 8 years, the stimulating methods alone should be used vigorously and with perseverance, and even in mild cases, since a shortening of 2 cm. which is insignificant in an older child may indicate a serious involvement of the growth potential in a young child. When possible, diathermy is preferred, second choice going to intra-articular injections of blood. In severe cases, i.e., those in which the difference in length increases regularly, recourse may be made to surgical measures, preferably detachment of the periosteum, lumbar sympathectomy, and venous ligations. These methods are probably those of the future; they allow stabilization of shortening at its onset and are without danger. At the age of 8 years the question arises of slowing down the growth on the healthy side by epiphysiodesis, as roentgen therapy does not fulfill the requirements. At the end of the growth period, i.e., practically after the age of 13 or 14 years, the equalization methods may be considered when the shortness becomes burdensome (5 cm. or more). Lengthening, being a serious operation which presents frequent complications, should be reserved for special cases, while shortening, being safer, should be recommended in most cases.

RICHARD KEMEL, M.D.

Penicillin Therapy In Open and Closed Suppurative Arthritis of the Knee Joint (Penitsilinoterapiya na otvoreni i zatvoreni gnoini artriti na kolennata stava). GENCHO KRASTINOV. *Chir. orthop.*, Sofia, 1948, No. 2-3: 89.

Fifteen cases of traumatic suppurative arthritis of the knee have been observed at the university clinic of Plovdiv, Bulgaria, during the period from 1940 to 1948. Ten of these were open wounds, received mostly from knife or hatchet cuts connected with woodworking, 4 were closed infections, and 1 case

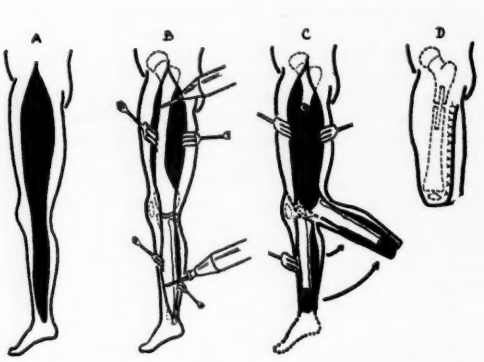


Fig. 1. (Van Nes) Technique of partial turn-up-plasty.

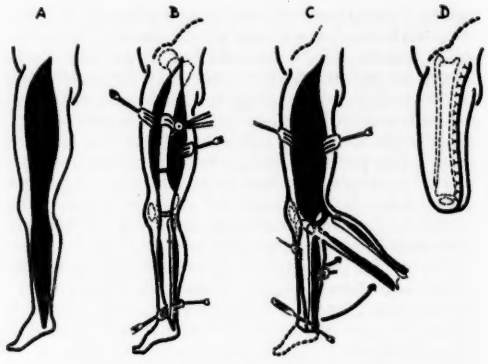


Fig. 2. Technique of total turn-up-plasty.

was a tuberculous arthritis with secondary suppurative infection. At first, general measures were instituted without immobilization with indifferent results; then immobilization was started with the parenteral administration of the sulfonamides, still with unsatisfactory results; finally, penicillin therapy was instituted with immobilization in a plaster of paris splint or cast. The period of hospitalization then dropped from several weeks to a few days, and when treatment could be adequate, the functional results (both immediate and after follow-up periods of from 2 to 6 months) were invariably good.

The penicillin was always injected intra-articularly in dosages of 50,000 I. U., an equivalent quantity of joint fluid usually being withdrawn in closed cases. In 1 open case adhesive was used to seal the articular cavity so that the penicillin solution could be retained. As a rule, from 3 to 5 injections at 3 or 4 day intervals were sufficient to bring down any temperature present, to return the blood picture and sedimentation rate to normal, and to produce a sterile joint fluid. Lately the joint has usually been sutured with or without trimming of the wound edges. This changed the open infection into a closed one, and in nonsuppurative cases shielded the joint against secondary infection.

In 1 case the penicillin brought the temperature down initially but later the patient did not respond very well as there were subfebrile rises in temperature and puncture of the posterior recess of the articular cavity revealed turbid fluid. This recess was then injected separately, with complete success. This result causes the author to discuss the anatomical work of Voino-Yasenetzkii, who showed that the articular cavity of the knee is divided into anterior and posterior recesses which are connected by narrow communicating passages, and that the posterior recess is also partially divided into two cavities by a sagittal septum consisting of the posterior cruciate ligament with its synovial fringe and Robert's ligament. In infectious conditions these partial septa may become total. JOHN W. BRENNAN, M.D.

Transplantation of the Tibia and Fibula to Replace the Femur following Resection. "Turn-Up-Plasty" of the Leg. C. P. VAN NES. *J. Bone Surg.*, 1948, 30-A: 854.

Transplantation of the tibia and fibula to replace the femur is indicated in partial or total resection of the femur in cases of tumors, osteomyelitis, or severe trauma. Under tourniquet an incision is made along the entire lateral aspect of the extremity. A partial or total resection of the femur is done. The tibia and fibula are turned up and inserted into the thigh bone in such a manner that the malleolus fits into the acetabulum. In partial resection of the femur, the cut section of the tibia fits the amputation stump of the femur. A small bone graft is inserted to hasten bony union.

The author reports the case of a 21 year old man in whom the femur was excised because of Ewing's tumor. A total "turn-up-plasty" was performed. His second case was that of a 33 year old woman in whom a partial excision of the femur had to be done because of a malignant giant-cell tumor. A partial "turn-up-plasty" was done.

Both patients were satisfactorily fitted with a prosthesis. The operation was successful from the cosmetic point of view. GEORGE I. REISS, M.D.

FRACTURES AND DISLOCATIONS

The Treatment of Supracondylar Fractures of the Humerus by Kirschner-Wire Transfixion. ALVIN L. SWENSON. *J. Bone Surg.*, 1948, 30-A: 993.

After supracondylar fracture of the humerus, the fragments of bone are fixed by means of transfixing wires. This method of blind pinning was used in 10 cases in which there was external swelling about the elbow. The wires held the fragments until union occurred, except in 1 case. The wires were removed under local anesthesia.

This procedure is recommended when immobilization in acute flexion following closed reduction is not justified. RICHARD J. BENNETT, JR., M.D.

Two-Stage Reduction of the Posterior Marginal Fragment in Dupuytren's Fracture (Réduction en deux temps du fragment marginal postérieur dans la fracture de Dupuytren). CH. A. PERRET. *Helvet. chir. acta*, 1948, 15: 235.

When Dupuytren's fracture is complicated by the presence of a large tibial, marginal, posterior fragment which is displaced upward, and continuous extension obtained by means of a Kirschner pin passed through the calcaneus is used, the fragment does not always move down far enough to reassume its normal place and the functional result is often unsatisfactory. The fractured surface of the fragment and the corresponding surface of the tibia are rough and present bony prominences which prevent the fragment from sliding down; in addition, the fragment is kept firmly in contact with the tibia by the traction applied to the muscles and tendons of the flexors of the foot and toes during the continuous extension, and the reflex tonus of these muscles is stimulated by the pain, hematoma, and displacement of the fragment over which they slide without friction under normal conditions. Thus, manual or continuous extension keeps the two rough surfaces one against the other and prevents reduction. Another unfavorable factor may intervene: after the foot is put back in place, traction is generally exerted parallel to the axis of the leg and the weight acts through the calcaneus and the posterior wall of the capsule of the tibiotarsal joint on the inferoposterior edge of the fragment which then tips backward and catches its inferoanterior edge against the fractured surface of the tibia.

To eliminate these obstacles to reduction in Dupuytren's fracture, it is necessary to use the following method:

1. The foot must be temporarily kept in its position of subluxation backward, and its lateroexternal displacement alone corrected.

2. From the onset, the traction must be exerted in an oblique descending direction, which sometimes aggravates slightly the backward subluxation of the foot. Under these conditions a traction of from 5 to 7 kgm. opens the interfragmental space, and pulls the inferoanterior edge of the fragment away from the tibia and dislodges it. This leaves the fragment in contact with the tibia through its proximal end only and allows it to descend.

3. As soon as the fragment is in its place and with continuance of the traction, the subluxation of the foot is reduced manually under a short intravenous anesthesia. To maintain reduction, a strong, padded plaster splint is applied to the anterior surface of the leg and foot and bandaged to the supporting apparatus. Until complete consolidation of the fracture, extension is exerted in a rather pronounced oblique ascending direction.

4. When the fracture is consolidated, a walking plaster cast, enclosing the leg from the knee down and the foot at a right angle and in supination, allows the patient to get up and move about.

RICHARD KEMEL, M.D.

Treatment of Simultaneous Fractures of the Two Bones of the Forearm in Adults (Le traitement des fractures simultanées des deux os de l'avant-bras chez l'adulte). R. SOEUR. *Rev. orthop.*, Par., 1948, 34: 201.

Fresh fractures of the bones of the forearm, located in the region of the interosseous membrane and presenting displacement, are relatively not frequent in the adult, but their treatment is difficult. In their orthopedic treatment under local or brachial plexus anesthesia, with the patient in dorsal decubitus, the elbow flexed at a right angle, and the hand in functional position, traction is made separately on the thumb and the fingers through finger cots of braided fiber, and the progress of the reduction is observed by fluoroscopy. Overriding, angulation, rotation, and lateral displacement must be corrected. It is preferable not to pad the plaster cast, which consists of a dorsal splint fixed by a gauze bandage and then by plaster bandages over it; this apparatus must extend from the metacarpal heads to the upper third of the arm with the elbow flexed at an angle of 90 degrees. Immobilization is maintained until clinical and roentgenologic consolidation is obtained; this takes from 8 to 12 weeks and sometimes more. Secondary displacements may occur if the apparatus is supported by a sling. The method offers no danger, is applicable to all cases, shortens hospitalization, and provides successful results with rapid consolidation, minimal callus, and easy functional recovery. Unfortunately, it presents also some cases of failure; secondary displacements can be corrected if discovered in time and premature removal of the cast can be avoided, but reduction remains the great obstacle, no matter how experienced the surgeon may be. Reduction is successful only if the axial angulation is less than 5 degrees in any direction and if coaptation of the fragments amounts to 80 per cent.

Surgical reduction followed by the correct application of a plaster cast suffices to permit healing of many of these fractures, but the advocates of this method admit that reduction is not always maintained and that, if the reduction seems unstable during the manipulation, it is better to complete it with a prosthesis. Economical osteosyntheses (screws, plates, clips, sutures) have caused numerous disappointments. External fixation is still advocated by some for open fractures but has not been used in recent traumatisms: large half-exteriorized screws cause osteitis. Bone grafts still serve for pseudarthroses, but their complicated technique has eliminated them in cases of fresh fractures. This leaves synthesis by plates, the coaptator of Danis, and medullary pinning or nailing.

During past years the plate method has been discredited. The coaptator of Danis consists of a thick, hard, stainless steel plate, having three holes; on the side of its reinforced extremity, it has a groove, at the distal end of which there is a pressure screw; the screws used to fix the appliance to the bone are capable of resisting a tearing-out force from 4 to 5

times greater than that of the usual screws; they are very tightly seated in the respective holes and remain rigid like the teeth of a comb. No plaster cast is used, but the forearm is protected by a reinforced celluloid cuff which is laced in place when the patient goes out or wants to sleep. Consolidation was obtained in 34 cases in which the appliance was used, but synostosis occurred in 4 because of technical errors.

The theoretical objections against medullary pinning, such as danger of embolism, massive infection of the bone marrow, moving of the pin, have been refuted by the facts. The method is simpler than the other osteosyntheses, surgical trauma is minimal, and reduction is necessarily good. Insertion of the pin is easy in the ulna but somewhat more difficult in the radius. Retention of the fragments is solid and allows early resumption of movements. Results are encouraging.

As to the question whether open reduction should be used systematically or efforts be made to perfect the subcutaneous method, Soeur thinks that, perfect reduction being essential, surgical exposure of the fragments is indicated. Medullary pinning or nailing is gaining in favor. However, this does not mean that the orthopedic method should be abandoned, since there will always be some cases in which osteosynthesis is unnecessary or contraindicated.

RICHARD KEMEL, M.D.

Traumatic Dislocation of the Hip Joint. J. R. ARMSTRONG. *J. Bone Surg.*, 1948, 30-B: 430.

This report deals with the types of traumatic dislocations of the hip joint and the early results in 101 cases in the Royal Air Force hospitals. The incidence of dislocation of the hip was 1 in 520 admissions.

Before the era of motor vehicles, the classical cause of dislocation was wide and forcible abduction of the lower limbs, the limb acting as a long lever to force the femoral head through the inferior aspect of the joint capsule. Anterior, posterior, or inferior dislocation occurred according to the amount of internal or external rotation of the extremity at the time of injury. In this series, only 8 dislocations were of this type, and 93 were due to considerable violence of high velocity acting in the line of the shaft of the femur.

The exact nature of the dislocation depends upon the position of the limb when the force is applied. If the hip joint is flexed and adducted, the head of the femur is driven out of the back of the joint where the capsule is weak and the acetabulum relatively shallow. With less flexion and less adduction the head is driven against the strong posterosuperior buttress of the acetabulum which is fractured. If the hip is extended and abducted a central fracture-dislocation is produced.

Dislocations of the hip joint can be classified into four main types: simple dislocations, dislocations with fracture of the acetabular rim, dislocations with fracture of the acetabular floor, and dislocations with fracture of the femoral head.

In simple dislocations the management was relatively easy. The treatment soon became uniform in the various centers: namely, reduction by manipulation under general anesthesia; immediate immobilization in a hip spica for 8 weeks; mobilization with nonweight-bearing exercise for about 4 weeks; and, finally, treatment at a rehabilitation center for a month or 6 weeks with gradual return to full activity.

Patients were classified as normal if there was no muscle wasting, no limitation of movement, no roentgenographic evidence of abnormality, and no real discomfort after engaging in full activity. Of 46 dislocations, 35 (76 per cent) were associated with no symptoms or disability remaining after a period of treatment ranging from 4 to 7 months. Calcification in the joint capsule with no disability occurred in 2 patients. Arthritic changes in the joint were present in 6 patients. These had slight wasting of the thigh muscles, mild limitation of joint motion, and some discomfort or aching pain which was made worse by exercise. Avascular necrosis of the femoral head occurred once. Myositis ossificans resulted in 1 case in which the patient was treated by massage and early passive and active exercises immediately after reduction. This was continued for 10 weeks.

Late follow-up was obtained in 19 of these 46 patients. Fourteen had been considered normal at the conclusion of the early treatment. From 1 to 4 years after the injury, only 5 reported that their hips were still quite normal; 6 complained of trivial aching and pain; 3 had vague symptoms only after exertion.

Forty-three patients suffered posterior dislocations with fractures of the acetabular rim. Both reduction of the dislocation and accurate replacement of the bony fragment had to be accomplished. Frequently the fragment will be reduced well with reposition of the hip. In this case treatment was similar to that of simple dislocation. If satisfactory reduction of the acetabular fragment was not obtained in this way, the limb was immobilized in traction. In most instances the fragment fell back accurately into place within a few days. Traction was maintained about 6 weeks and then immobilization maintained by plaster spica.

In 1 case with associated sciatic paralysis, the fragment could not be reduced conservatively and open operation with screw fixation was performed. At operation the sciatic nerve was found to be impaled over the fragment. Complete nerve recovery occurred in 6 months. This was the only complete recovery among 2 cases of complete sciatic paralysis and 5 cases of external popliteal nerve paralysis. Two other patients were explored several months later, but nerve function did not improve. In these 2 cases, the nerve was likewise sharply indented by a bony fragment of the acetabulum.

Results in dislocation with fracture of the acetabular rim were not as good as in simple dislocations. Twenty-seven of the 43 patients (63 per cent) were considered normal after completion of the early treatment. Two patients died shortly after injury.

Nine patients showed arthritic changes clinically and roentgenologically. One case of each of the following occurred: calcification in the joint capsule, persistent displacement of the acetabular fragment with no disability, avascular necrosis of the femoral head, failure of the reduction of the dislocation, and open reduction and mold arthroplasty.

A later follow-up was made in 15 of the 43 patients. Of 7 patients previously classified as normal, 5 remained so, and 2 complained of slight aching and stiffness. Five arthritic hips remained unchanged. One patient with calcification of the capsule reported some aching. The patient with avascular necrosis remained unchanged and was awaiting arthrodesis. The patient with the mold arthroplasty had satisfactory function with about one-half of the normal range of movement.

Cases of dislocation of the hip joint with fracture of the acetabular floor were classified in two groups: 3 were of the central type of dislocation, and 4 were posterior dislocations involving the floor of the acetabulum. In the central type the hip joint function was lost. The patients had arthritis, and/or fibrous or bony ankylosis. Two posterior dislocations were reduced by traction but eventually traumatic arthritis set in. This group of patients was subject to uniformly poor results relative to hip joint function. Two had sciatic paralysis with incomplete recovery.

In the treatment of dislocation of the hip joint with fracture of the head of the femur, three factors had a bearing on the prognosis: (1) the degree of damage to the femoral head, (2) the ease with which displacement could be reduced, and (3) the accuracy of replacement of the femoral fragment.

Only one of these patients could be considered normal after 16 months. This patient had a fracture with a fragment about one-sixth of the femoral head that was in good position following reduction of the hip dislocation. Three fractures in the group of 5 could be reduced by manipulation. One patient with a small femoral head fragment obtained good hip function, but had sciatic paralysis which did not leave completely and marred the result. One patient has traumatic arthritis and 2 others were subjected to arthrodesis.

In the whole series, 2 patients had dislocations which remained unreduced. Experience showed that late operative reduction and reconstruction or arthrodesis were very difficult. The author cites 1 patient in his previous experience who had a simple dislocation and had excellent function for about 5 years and then developed aseptic necrosis of the femoral head. He wishes to point out that this is not an end-result study. He expects that some of the apparently normal hips will develop necrosis of the femoral head and traumatic arthritis, or both.

Further, he states that if the reported results of sciatic paralysis as a complication of acetabular rim fracture can be considered typical, exploration of the sciatic nerve should be performed at the earliest time possible after reduction of the dislocation.

KENATH H. SPONSEL, M.D.

Fractures of the Neck of the Femur. GEORGE W. VAN GORDER. *J. Am. M. Ass.*, 1948, 137: 1181.

The femoral neck fractures present certain inevitable problems. They occur in old persons at a site in the hip where the bone is narrowest and periosteal callus never forms, and where the blood supply is poor. It is also a site of great mechanical strain.

Modern concepts of treatment, in particular the Smith-Petersen nail, revolutionized the prognosis both for life and the solid limb of these patients, but there is still need to survey the progress and problems of treatment in the light of accumulated experience.

Because of the comfort afforded the patient and the minimum risk involved, nailing may be done in all patients with fracture of the femoral neck, provided only they are not acutely or hopelessly ill. Most surgeons agree that the optimum time is within the first week of injury.

All types of anesthesia are advocated, but most surgeons use either spinal or some form of general anesthesia for patients under 60 years of age, and for others, local, supplemented by gas-oxygen or ether at the time of reduction and nail insertion.

The success or failure of treatment depends upon securing an accurate reduction. Roentgenograms, taken in both anteroposterior and lateral planes after 24 hours of moderate traction, correct the external rotation, afford an appreciation of the distinctive features of each fracture so that the most effective means of reduction may be employed. At reduction an effort should be made to secure a position of valgus which converts the shearing force at the fracture site to a pressure force conducive to reunion. Careful study of clear roentgenograms, again taken in both planes, is necessary to be assured of accurate reduction.

Once reduction is secured, the leg can be held satisfactorily by an assistant who maintains the proper degree of internal rotation and abduction, and keeps the knee flexed at a right angle to help lock the fragments in place by keeping the extensor muscles tight. Special tables and traction set-ups are not necessary.

Vertical subcapital fractures are the most difficult to manage, for even when reduced, the weight-bearing line falls across the fracture so as to shear it apart rather than impact it. Often it is necessary to supplement the nail fixation with a bone-graft peg parallel to the nail. When accurate reduction cannot be obtained, either open reduction or an osteotomy must be undertaken.

Under ordinary circumstances, the fracture is least disturbed by so-called "blind nailing," which is generally used. The specific technique may be highly individualized and "gadgetized," but the author prefers and describes the procedure as carried out at the Massachusetts General Hospital, Boston.

Aftercare varies tremendously in different clinics, but most surgeons keep their patients in bed, with or without support, for from 2 to 6 weeks, then

permit crutch-walking without weight-bearing. Early weight-bearing may be dangerous, and only when there is roentgen evidence of solid union may it be safely permitted.

The prognosis in fractures of the femoral neck depends largely upon the site and obliquity of the fracture line. Excellence of nursing care is the other major factor in survival of this elderly type of patient. FRANCES E. BRENNECKE, M.D.

ORTHOPEDICS IN GENERAL

Criteria for Spine Fusion Following the Removal of a Protruded Nucleus Pulposus. GUY A. CALDWELL and WILLIAM B. SHEPPARD. *J. Bone Surg.*, 1948, 30-A: 971.

In follow-up studies for from 3 to 7 years it was found that excellent results were obtained in about as many cases treated by laminectomy as in those treated by the combined operation. Hypertrophic changes were found in nearly two-thirds of all the patients operated on, with or without narrowing of the intervertebral space.

Recurrences were observed in 8 per cent of all patients treated and had no relation to the history, physical findings, anomalies, or postoperative observations.

The author suggests that spinal fusion be limited to a selected group of cases of protrusion of the intervertebral nucleus pulposus.

GEORGE I. REISS, M.D.

Clinical Study of Muscular Torticollis (Die Klinik des muskulaeren Schiefhalses). C. J. GAUSS. *Geburtsh. & Frauenh.*, 1947, 7: 121.

On the basis of 40 years of study of the clinical aspects of muscular torticollis, the author is inclined to reject the theory of a traumatic or traumatic-inflammatory origin of this condition. He is more inclined to favor the theory of intrauterine pressure as a causative factor, thus admitting the possibility of indirect heredity in the nature of a familial predisposition to breech presentation.

Roentgenograms taken during pregnancy (lateral flexion of the head with elevation of the posterior shoulder), as well as postnatal demonstration of threatening caput obstipum (atrophy of the sternocleidomastoid muscle), of beginning caput obstipum (induration of this muscle), and of fully developed caput obstipum (shortening of the muscle with inclination of the head), serve to complete the clinical picture of congenital torticollis.

With the diagnosis of threatening caput obstipum possible at birth, the immediate institution of orthopedic measures may spare many patients later surgical intervention. A valuable prophylatic measure would be the early conversion of a breech presentation during pregnancy, which would likewise serve to reduce infant mortality considerably, and would be justifiable for this reason alone.

EDITH SCHANCHE MOORE.

The Response of the Quadriceps Femoris to Progressive-Resistance Exercises in Poliomyelitic Patients. THOMAS L. DELORME, ROBERT S. SCHWAB, and ARTHUR L. WATKINS. *J. Bone Surg.*, 1948, 30-A: 834.

This study is based on 27 quadriceps femoris muscles. Spring scales and ergograms, work capacity, limb volume, electrical activity, and the ability to perform ordinary activities with less effort and fatigue were used to evaluate the progress of the treatment.

It was found that the remaining innervated muscles following acute anterior poliomyelitis increased in strength and work capacity in much the same manner as normal muscles.

GEORGE I. REISS, M.D.

Pollicisation of the Index Finger. JAMES B. CUTHBERT. *Brit. J. Plast. Surg.*, 1948, 1: 56.

A case of successful substitution of the index finger for an amputated thumb is presented in this article. Only a short first metacarpal stump remained following a gunshot wound of the hand. Operation was carried out in stages, great care being taken to preserve the nerve and blood supply of the new digit. In five stages, a useful new thumb with an excellent cosmetic result was obtained. The principles of pollicisation of the index finger and the details of each stage are presented.

JOHN L. BELL, M.D.

SURGERY OF THE BLOOD AND LYMPH SYSTEMS

BLOOD VESSELS

Discussion on Primary Treatment of Varicose Veins. A. Dickson Wright, J. B. Kinmonth, A. M. Boyd, Peter Martin, and Others. *Proc. R. Soc. M.*, Lond., 1948, 41: 631.

Dickson Wright. A radical attack now in use by this author for the primary treatment of varicose veins is to ligate as many veins as necessary while the patient is under a general anesthetic. One hundred cubic centimeters of 30 per cent saline solution is used to inject every varix thoroughly and obtain obliteration of the whole network of varices and the deep communicating veins at once. Bandaging the leg with elastoplast reduces the bulk of the clot. Any vein escaping this onslaught is injected at postoperative visits.

The contraindications to treatment are old age, obesity, and diabetes. If arterial disease is present, great caution is indicated.

The complications of treatment are important. If a thrombophilia is stirred up, anticoagulants must be used.

Allergic response to the solution is treated with adrenalin, ephedrine, and benzedrine.

The complications of varicose veins, thrombosis, eczema, and pruritus are all cured by obliteration of the varicose vein, except in patients with incompetent deep veins or old femoral thrombosis. These are treated with various types of compressive bandages, bed rest, or both.

Kinmonth reports a study of 100 venograms made at operation and on outpatients. Histological studies were also carried out on portions of veins removed at operation from some 20 patients who had had previous vein injections.

1. Retrograde injection at operation. A series of venograms made by injecting from 1.5 to 8 c.c. of a radiopaque solution suggests that this method is inefficient because: (a) much of the dye goes straight into the deep veins, (b) spasm of the great saphenous vein occurs because of the irritation of the catheter so that little injected fluid stays in the vein, (c) little fluid goes below the knee as it tends to pass into the communicating veins or even normal veins. With larger quantities of fluid than 8 c.c. the excess goes straight into the deep veins.

2. Fluoroscopic screening. Dye injected into normal superficial leg veins never passes distally, even if there is a tourniquet above the site of the injection. Dye injected into varicose veins with the patient standing sinks rapidly toward the ankle. Dye injected into a varicose vein with the patient lying remains at the site of the injection until the patient moves the limb.

3. Serial venograms of direct injections into leg varicosities show that from 1 to 1.5 c.c. is the optimum amount for a single injection. Larger amounts tend to spill over into the deep veins. Entry to the deep veins is particularly likely to occur, as would be expected, in tributaries of the small saphenous vein at the back of the calf.

Serial pictures also revealed that fluid passing into the deep veins remains there longer than one would expect; it is not instantly swept away, but may often be seen still lying in some concentration a minute or more after injection. It remains for a longer time still in the communicating veins and can often be seen lingering around the valves. As valves are delicate structures this observation is to be considered a significant one.

Histological studies. Small portions of veins were excised from patients who had injections a few days beforehand. Often inadequate clinical "takes" revealed edema of the walls and clotting. These changes were most marked at the region of the valves, which often were adherent when no clinical "take" had been obtained.

CONCLUSIONS AS TO TREATMENT

1. For serious cases with incompetent great saphenous valves a high saphenofemoral ligature, probably combined with ligature at the knee level, or in the thigh if a communicating vein blow-out is detected, should be made. No retrograde injections are to be made. Local injection of the calf varicosities should be done if necessary at a later date.

2. For mild cases the affected vein should be injected by means of an empty vein technique with the limb horizontal. Not more than 1.5 c.c. should be given in each injection. The leg is to be kept still for 5 minutes, and then moved vigorously to sweep the fluid away.

Boyd. A follow-up study of 60 patients treated at St. Bartholomew's Hospital over an 8 year period revealed a steady increase in the recurrence rate year by year. The reason for these unsatisfactory results lies in the etiology of varicose veins. Varicose veins are primarily due to a congenital weakness of the valves. The condition is progressive. No single operation is likely to cure them.

Pain in varicose veins is caused by varices in the muscular communicating veins of the calf, complete dilatation of the internal saphenous vein, involvement of the cutaneous nerves in periphlebitis, or deep phlebitis of the calf.

Deep phlebitis is not a contraindication to ablation of the superficial varices; it is in fact an indication for operative treatment.

Chronic swelling of the leg with no history of phlebitis may at times be due to varicosities of the deep veins.

Treatment. The sheet anchor of treatment is ligation. In addition to proximal ligation, distal ligations at the sites of incompetent perforating veins should be undertaken.

It is important to look for an accessory saphenous vein, which at times perforates the fascia distally and joins the femoral vein below the fossa ovalis.

Despite older opinions, no harm can come from leaving a stump of the internal saphenous vein, and one will not injure the femoral vein if he ligates at a safe distance.

A short segment of the internal saphenous vein including the perforating vein should be removed in the lower third of the thigh. The communicating vein often found behind the knee between the external and internal saphenous veins should be ligated if present.

Deep phlebitis occasionally follows retrograde injection of sclerosing solutions. A retrograde injection of pyelectan into the distal end of the saphenous vein divided in the groin has been shown by roentgenograms to enter the femoral vein via the perforating veins in every case in which it was used.

If the retrograde injection is carried out at the knee level, the radiopaque solution could only occasionally be seen in any quantity in the popliteal vein.

These tests show that retrograde injection at the groin is unsafe, and that injections of not more than from 3 to 5 c.c. at knee level are in most cases quite safe. EDMUND R. DONOGHUE, M.D.

The Symptoms and Treatment of Arterial Aneurysm of the Upper Extremities (Das Aneurysma der Arterien der oberen Gliedmassen, seine Erscheinungen und Behandlung). KARL BAETZNER. *Chirurg*, 1948, 19: 294.

The author presents a series of 27 cases of arterial aneurysm of the upper extremities. Because of favorable anatomic conditions, a good collateral circulation often develops, so that in a certain number of cases ligation is possible. Routine ligation is not to be recommended, however, since it may be followed by serious circulatory disturbances and necroses. If the collateral circulation cannot be rated as 100 per cent efficient before or during operation, an attempt must be made to restore the normal passages after removal of the aneurysm. The simple technique of lateral and circular suture can be used in only a few cases. If a large arterial defect remains following removal of the aneurysm, it must be repaired by plastic operation on the veins.

The majority of the sutured arteries appeared permeable in the arteriogram following operation, but even with nonpermeable sutures and transplants, the clinical results were satisfactory, since the sutures and transplants heal only gradually and only with a properly functioning collateral circulation. At any rate, the excellent clinical results obtained by sutures and transplants, in contradistinction to ligation, indicate a satisfactory restoration of the normal blood route.

The marked involvement of the nerves in almost all arterial aneurysms of the upper extremities was a striking feature. The nerves were affected chiefly by pressure of the aneurysmal sac, which stressed the indication for the earliest possible operation. However, nerve injuries occur also in cases of pure fistula. The disturbances are particularly marked following the anastomosis of an arteriovenous fistula with a large aneurysmal sac, because in these cases not only pressure injuries but also poor circulation in the periphery plays a part. Removal of the aneurysm and restoration of the normal channel by early operation may prove a requisite for the return of nerve function. Protracted delay in operating may lead to most severe atrophy and dystrophic disturbances with contracture of the muscles and ankyloses. The best prophylaxis of these serious complications lies in primary suture of the vessels. The diagnosis, nerve involvement, treatment, and results of treatment in these 27 cases are tabulated. The cases include aneurysms of the axillary artery, and of the brachial artery and its branches. The diagnostic value of arteriography is stressed. This procedure permits demonstration of the exact site of the aneurysm, the venous involvement, and frequently also of the state of the collateral circulation. Ligation is justified when arteriography reveals a good collateral circulation, when the distal portion of the main artery is obliterated and its function has been assumed by a larger branch, or when the main artery is so narrow that a good collateral circulation must be assumed.

Ligation of the afferent artery without radical operation on the aneurysm cannot be recommended, except in certain special cases of ligation of the hypogastric artery in aneurysms of the gluteal artery. An arteriovenous aneurysm can be cured only by complete separation of the artery and vein. Because of the poor results obtained by ligation of the main artery, the author attempted restoration of the natural route in all cases with a good collateral circulation. Lateral suture, although yielding excellent results, is rarely feasible because the arterial defect is usually so large that a resection of the area is necessary. The arterial stumps have then to be united by direct suture. This yielded excellent results in 3 cases. In 10 cases the arterial defect was repaired by venous transplantation. In 6 of these cases the aneurysm was purely arterial, with a very large sac in some cases; in 2 cases there was an arteriovenous aneurysm and in 2 others a pure arteriovenous fistula. No significant circulatory disturbances ensued. In 21 of the 27 cases, the nerves were involved.

EDITH SCHANCHE MOORE.

SURGICAL TECHNIQUE

OPERATIVE SURGERY AND TECHNIQUE; POSTOPERATIVE TREATMENT

Entity and Significance of Variations in Plasma Proteins in the Normal Postoperative Course (Entità e significato delle variazioni proteinemiche nel decorso postoperatorio normale). ANTONIO LANZARA, ALDO VITI, and FRANCO CIUFFINI. *Policlinico, sez, chir.*, 1948, 55: 1, 75.

The causes of hypoproteinemia may be summarized under three headings: (1) chronic malnutrition, (2) loss of protein from the body, and (3) deficient protein formation. Studies of plasma proteins were undertaken in eight groups of surgical disorders to ascertain the presence or extent of these factors in the normal postoperative course. Treatment consisted essentially in the replacement, volume for volume, of fluid lost.

For the quantitative determination of plasma proteins a refractometric method was employed, the results of which are likely to run from 7 per cent to 10 per cent higher than those obtained by the Micro-Kjeldahl method.

In 14 cases of thyroid surgery, only minor and insignificant changes were observed in the total proteins. In those instances of simple goiter, as in Basedow's disease, the albumin-globulin ratio declined postoperatively but regained the preoperative level by the seventh day.

In 24 patients who underwent gastroduodenal surgery, all showed normal preoperative protein values. The average postoperative values for total protein as well as for albumin-globulin were more markedly reduced than in the first group.

Five, of a total of 11, gynecological cases showed inversion of the albumin-globulin ratio.

The 10 patients who underwent appendectomy differed from preceding groups in that they showed less variability in postoperative protein values.

Four further groups, including patients with diseases of the biliary tract, diseases of the lungs, patients who had undergone minor surgical procedures, and one patient who had undergone major surgery demonstrated total protein and albumin-globulin curves at minor variance only from those of the other groups.

The authors conclude that the variations noted in the albumin-globulin ratio are of humoral origin and that surgical procedures with uneventful recoveries are not characterized by significant shifts in plasma protein concentration.

EDITH B. FARNSWORTH, M.D.

The Significance of Urine Chloride Determination in the Detection and Treatment of Dehydration with Salt Depletion. K. KELLER VANSLYKE and EVERETT IDRIS EVANS. *Ann. Surg.*, 1948, 128: 391.

Primary water depletion is a form of dehydration due to the inadequate intake of fluids while primary salt depletion is due to the abnormal loss of salt from the body, also resulting in dehydration because of the fact that the kidneys will not retain water without salt.

In primary water depletion plasma chloride concentration remains normal, the extracellular fluid becomes hypertonic, water passes across the cell membrane into the extracellular space, and there is a diminished output of water by the kidneys. As a result, intracellular dehydration becomes marked but no change may be detected in the plasma volume or in the electrolyte concentration.

In primary salt depletion hypotonicity of the extracellular fluid is averted by excretion of water without salt by the kidneys. The urine of patients with either water depletion or salt depletion shows more significant variations in volume and salt concentration than those found in the plasma. The severity of the depletion can be ascertained by changes in the chloride, the carbon dioxide, the specific gravity, and the hematocrit of the blood.

Water and salt depletion and replacement were studied in 3 healthy volunteer students. From these experiments the authors concluded that salt and water balance was normally maintained when urinary excretion exceeded 1,500 ml. and the salt excreted averaged 3 gm. per liter. Urine salt determination by the Fantus method served to indicate the type of intravenous therapy needed. Thus, an excess of 3 gm. of salt per liter of urine justified an infusion of water whereas a concentration of salt less than 3 gm. per liter indicated the infusion of a saline-containing fluid. Measurement of the urine volume were indicative of the need of water replenishment. In patients with impaired kidney function the plasma chloride should be measured to determine the degree of salt depletion.

In every case the discussed laboratory guides should be accompanied by clinical examination for edema, skin turgor, thirst, respiration, and mental status.

BENJAMIN G. P. SHAFIROFF, M.D.

Further Experiences with Peritoneal Irrigation for Acute Renal Failure. HOWARD A. FRANK, ARNOLD M. SELIGMAN, and JACOB FINE. *Ann. Surg.*, 1948, 128: 561.

This report is based on a study of 18 cases of acute renal insufficiency treated by peritoneal irrigation. Since the earlier work on hematodialysis, improvements have been made in the apparatus and in the irrigating fluid. The amount of sodium chloride was reduced to prevent hyperchloremia, calcium ions were doubled because of the hypocalcemia due to uremia, phosphates were omitted from the solution because of the hyperphosphatemia, and gelatin was added to obviate the absorption of water. Heparin and penicillin were no longer added to the irrigating solution. The sump drain is placed under the costal

margin and through a subcutaneous tunnel which is directed into the peritoneal cavity at the lower end of the abdomen. Three lines feed the mechanism, one to the fluid carboy, another to the suction line, and a third to the air inlet. The drainage fluid is frequently examined for bacteria and lymphocytes. Irrigation is stopped after 72 hours to avoid peritonitis. Because of anorexia, vomiting, and ileus, the gastrointestinal tract is intubated. Parenteral fluids are limited to about 1 liter daily in order to prevent overhydration. By means of peritoneal irrigation, from 25 to 50 gm. of urea can be extracted from the blood in 24 hours.

Peritonitis remains as the most serious complication of irrigation with the colon bacillus as the causative organism. Streptomycin was given only after the peritonitis was diagnosed but penicillin and sulfathalidine are used for prophylaxis.

In the present series 14 of the 18 patients died, 5 because of irreversible kidney lesions. Three patients died because of the peritonitis which developed as a result of irrigation. The etiology of the renal insufficiency in the 4 patients who recovered was sulfathiazole poisoning, shock, incompatible blood, and eclampsia. Renal recovery consisted in the return of glomerular function followed by the slower return of tubular function. Urine volume excretion becomes markedly increased. Its specific gravity ranged from 1.003 to 1.010; the urine was usually alkaline and had a urea concentration not greater than twice the urea of plasma. The large loss of chlorides during the phase of diuresis may cause severe dehydration and is indicative of inadequate renal function. With improvement of tubular function the specific gravity of the urine rises, acidity increases, and acidosis and hyperphosphatemia subside. Complete recovery to normal kidney function is not attained. Peritoneal irrigation is not suitable for routine clinical use.

BENJAMIN G. P. SHAFIROFF, M.D.

The Treatment of Renal Insufficiency in the Surgical Patient. FREDERICK A. COLLER, KENNETH N. CAMPBELL, and VIVIAN IOB. *Ann. Surg.*, 1948, 128: 379.

Acute renal insufficiency can be divided into four clinical phases: the period of hypotension, the period of oliguria or anuria, the phase of diuresis, and the final or recovery phase. The treatment in the first period consists of the use of blood transfusions, oxygen, and intravenous fluids. This is a preventive period. When the diagnosis of anuria is made, the blood type should be carefully checked and extrarenal causes for renal obstruction should be eliminated. During the second phase the total fluid intake should be restricted to the insensible loss due to perspiration and respiration. The amount of fluid intake should be limited to about 1 liter, given either orally or intravenously. The nonprotein nitrogen and the carbon dioxide combining power of the blood are determined at frequent intervals. When the latter falls to 40 per cent or lower, correction is made by means of the oral administration of sodium bicarbonate or the intravenous administration of sodium lactate. Calcium gluconate is administered intravenously each day to prevent tetany. If tolerated, the patient is allowed food by mouth with limitation of salt to from 200 to 800 mgm. daily. If edema is present the salt and fluid intake is rigidly limited.

During the phase of recovery, diuresis with the loss of abnormal amounts of water and salt may cause severe dehydration and hypopotassemia. Urine examinations should be made frequently for the estimation of potassium, sodium, and chlorides. The large urine output is replaced by intravenous administration of equivalent amounts of Ringer's solution and oral administration of fluids, or both. After the return to a normal urine output, renal function tests are made to determine the degree of tubular recovery or regeneration.

As a result of this disease process nitrogenous excretion usually does not return to the normal level. Autopsy examination of 4 patients who died of acute renal insufficiency showed lower nephron nephrosis with various stages of regeneration of the tubular epithelium. BENJAMIN G. P. SHAFIROFF, M.D.

Intraosseous Infusions in Infants. E. CLINTON TEXTER and D. H. KAUMP. *J. Michigan M. Soc.*, 1948, 47: 1002.

A report of 383 intraosseous infusions given to 125 infants is presented, and in only one case was the attempt unsuccessful. The only complications were a subcutaneous abscess in 1 case and a local osteomyelitis in 2 cases, which were controlled by chemotherapy. The infusions consisted of blood and/or electrolyte solutions. Most of the infusions were given into the tibia by positive pressure with a closed system. Twenty-five infants expired, but in none of the cases was death attributable to the intraosseous infusion. This method is quite useful when continuous infusion is indicated, as in cases of diarrhea or major surgery. The authors feel that the risk of osteomyelitis has been overemphasized, and roentgenographic studies indicate no significant changes in the bone.

ROBERT MAYO TENERY, M.D.

ANTISEPTIC SURGERY; TREATMENT OF WOUNDS AND INFECTIONS

The Treatment of Lymphedema. RAINSFORD MOWLEM. *Brit. J. Plast. Surg.*, 1948, 1: 48.

Lymphedema may be caused by injury, such as circumferential avulsion of the skin and subcutaneous tissue, or it may be observed as an idiopathic lesion in which the obstruction is in the proximal nodes. The author defines three phases of the clinical and pathological course of the condition and correlates the treatment according to the phase present.

Phase 1 is manifested by swelling of the most dependent part of the limb. No pitting edema is

present, and the swelling subsides with elevation and rest. This condition may be held in abeyance by a pedicle flap of skin and full thickness subcutaneous tissue from an area of intact lymphatic drainage, which bridges the obstruction.

Phase 2 is characterized by marked pitting edema and trophic changes in the skin. Spontaneous weeping from the skin may occur. Progressive fibrosis of the dilated lymphatics and surrounding tissue is manifest in the pathologic section. A pedicle bridging the obstruction may halt further progress but will not correct the damage already present.

Phase 3 shows irreversible changes in the skin and subcutaneous tissue, which have become sclerosed. There is no response to elevation and rest, and a pedicle flap will not alter the appearance of the limb. The author recommends excision of the skin and subcutaneous tissue down to the deep fascia, and replacement with skin grafts upon the intact deep fascia.

Eighteen patients have been treated by the methods described. The article contains several photographs of patients before and after treatment. A short review of other methods of treatment is included. JOHN L. BELL, M.D.

The Intra-Arterial Administration of Penicillin in the Treatment of Infections (Penicilina intra-arterial no tratamento das infecções). DONATO D'ANGELO. *Rev. brasil. cir.*, 1948, 17: 431.

The technique used by D'Angelo is that of subdiastolic pressure adopted by Shaffer in 1947. The only contraindication to the treatment is the presence of an infected area at the site of injection. In this technique 1 gm. of papaverine hydrochloride is given subcutaneously 20 minutes before the injection of penicillin to help vasodilatation, and the extremity is washed with a tepid solution of potassium permanganate (1:9,000), which acts as a fungicide and deodorant (gangrene) and also as an adjuvant vasodilator because of its temperature. An arterial pressure cuff is applied directly above the lesion, and a 10 c.c. syringe with a short beveled needle is used. The site of injection is in the fold of the elbow for the upper extremity and in the inguinocrural region for the lower extremity; the technique for infiltration of the lumbar sympathetic on the left side may be used for the descending aorta with compression of the two femoral arteries to restrict diffusion of the solution; if the carotids are used, they may or may not be compressed after the injection.

Under local asepsis the surgeon immobilizes the artery between the index and third finger of his left hand, introduces the needle vertically into the vessel, and injects the penicillin solution at the rate of 1 c.c. per second. As soon as the injection starts, the assistant inflates the cuff, raising the mercury column to 80 mm. where he keeps it for 10 or 15 minutes. If for any reason it is necessary to repeat the puncture, which is difficult because the artery is contracted, it is best to wait a few minutes before another attempt is made. Injections may be made twice a day at the same site and also on the following days without any inconvenience. The injection must be given after incision and drainage, if these are called for, since the pain caused by venous stasis is then less severe.

Empirically, injections of 50,000 units of penicillin in 5 or 10 c.c. of isotonic serum were used in 15 cases of localized infection of the extremities with good results. In 1 case of osteomyelitis of the left frontal bone, penicillin was injected alternately in the two carotids without any disagreeable sensation for the patient. The first dose consisted of 250,000 units in 10 c.c. of physiologic serum; the subsequent doses were of 100,000 units.

In the treatment of localized infection of the hand it was noted that the results were the same whether the penicillin was started immediately after incision and drainage, or 48 or 72 hours later; the purulent secretion stopped completely in 24 hours, and one additional injection was sufficient to obtain healing.

RICHARD KEMEL, M.D.

The Treatment of Malignant Lip Furuncles with Emetine. EDUARD MELCHIOR. *Surgery*, 1948, 24: 724.

Emetine is usually considered strictly an antiamebic drug. However, the good results obtained in the treatment of nonamebic liver abscesses with this drug led the author to extensive trial of emetine in other bacterial infections such as peritonitis, biliary infections, and septicemia, with good results. He believes that the therapeutic capability of emetine demonstrated in these infections is an antitoxic effect rather than a bactericidal one.

Furuncles which are characterized by acute swelling and pain, progressive purulent infiltration of the surrounding tissues, formation of multiple miliary abscesses in this spreading periphery, and the development of signs of systemic involvement are referred to as "malignant furuncles"—more commonly called carbuncles. Emetine was used in a series of 8 malignant furuncles of the lip, with significant clinical improvement in all cases. In the first 3 cases the furuncles were treated simultaneously with emetine and incision, and these patients showed the most dramatic response to treatment as evidenced by their temperature curves. In Case 1, for example, the temperature on admission was 39 degrees. Incision and drainage was immediately instituted and the temperature rose to 39.5 degrees, a level which persisted the following morning until emetine was started. Immediately there was a drop in temperature, a normal level being reached 3 days later.

Similar results were obtained with treatment by emetine alone. Three of these 5 patients had low or normal temperatures to start with, but the immediate increase in well-being of the patient, decrease in swelling, and relief of pain were indices of the effectiveness of the treatment.

In Case 4, for example, the patient suffered from pain, low grade fever, and insomnia from a lip furuncle of 5 days' duration. Emetine was started and that night the patient slept well for the first

time since the onset. Within 24 hours the pain was entirely gone, and the swelling subsided rapidly during the next few days. A few weeks later a small abscess developed in the cheek. The abscess was opened and in 3 days had completely healed.

One remarkable feature of the emetine therapy was the marked increase of comfort and well-being in at least 4 of the patients, even before objective clinical signs showed a response to treatment.

The dosage of emetine hydrochloride used was 0.03 to 0.05 gm. twice daily, with a total of 0.4 to 1.0 gm. necessary to obtain full effect from the treatment. This treatment, with or without incision, resulted in cures in all 8 cases of malignant lip furuncles reported, even when septicemia was present as indicated by positive blood cultures.

STANLEY W. TUELL, M.D.

Aureomycin. LOUIS T. WRIGHT, MURRAY SANDERS, MYRA A. LOGAN, AARON PRIGOT, and LYNDON M. HILL. *J. Am. M. Ass.*, 1948, 138: 408.

Realizing the need for specific therapy in lymphogranuloma venereum, the authors treated 25 patients with aureomycin, a new antibiotic active against many rickettsiae and certain viruses, and not previously used in human beings. Cases were divided into 3 groups: (1) buboes, (2) proctitis, and (3) benign rectal strictures.

All patients gave a detailed history, and complete physical examinations and extensive laboratory studies were made. The drug was given intramuscularly in daily doses varying from 10 to 40 mgm.

Eight patients with buboes were treated and showed a decided reduction in the size of the nodes at the end of 4 days of treatment. In 3 cases, smears from aspiration of the bubo revealed inclusion and elementary bodies, which had all disappeared within 1 week after treatment.

Three patients with proctitis were treated and all improved, with cessation of rectal discharge, bleeding, and tenderness. After treatment, proctoscopic examination showed normal rectal mucosa.

Fourteen patients with benign rectal stricture were treated. All showed clinical improvement, with decrease in rectal bleeding, discharge, and pain, and an increase in stool diameter. However, no gross pathologic change in the fibrous rectal stricture was apparent.

Aureomycin suspended in isotonic saline solution occasionally produced a mild, easily rectified hypochromic anemia. No other toxic effects were noted. Since very small amounts of aureomycin were used in treatment, the amount of circulating antibiotic in the blood was not accurately demonstrable by present methods of assay.

S. LLOYD TEITELMAN, M.D.

ANESTHESIA

Balanced Anesthesia for Thoracoplasty. CLARENCE L. HEBERT. *Anesthesiology*, 1948, 9: 537.

The requirements of anesthesia for thoracoplasty include a nontoxic agent giving adequate oxygen, smooth rapid induction, regular and quiet respiration, a short recovery period, minimal postoperative complications, and nonexplosability. A form of balanced anesthesia was utilized for the past 3 years at the United States Marine Hospital, Staten Island, New York, for 75 patients receiving 147 posterolateral thoracoplasties. The technique is described in detail. Preliminary medication consisted of pentobarbital, 0.1 gm. by mouth, 1 hour before operation, morphine, 10 to 15 mgm., and scopolamine, 0.43 mgm. subcutaneously about 30 minutes before regional block was begun. The technique of paravertebral spinal nerve block is essentially that described by Lundy with the patient placed face down on the operating table and the chest raised on a small pillow. From 8 to 10 c.c. of 1 per cent metycaine solution is carefully injected into each of the paravertebral needles; then intravenous pentothal sodium is infused, and a 50 per cent nitrous oxide oxygen analgesia is given and maintained throughout surgery.

Results of the study indicate that the balanced anesthesia described provides a safe and satisfactory method to meet the special requirements of patients undergoing thoracoplasty. This type of anesthesia is nonexplosive and is therefore suitable for use with an electrosurgical unit. Paravertebral nerve block is a safe procedure in the hands of those trained in regional anesthesia. The incidence of postanesthetic complications appears to be no greater with this type of anesthesia than with other agents and methods.

MARY KARP, M.D.

Basal Anesthesia in Children, with the Use of Sodium Pentothal by Rectum. R. W. BURNAP, E. A. GAIN, and E. H. WATTS. *Anesthesiology*, 1948, 9: 524.

For the past 2½ years, anesthesia produced in children with sodium pentothal has been used routinely in the University of Alberta Hospital, at Edmonton (Canada). This technique was used in 300 cases. Its advantages were the avoidance of psychic trauma, especially in cases in which multiple surgical procedures were required, the smooth and rapid gas ether inductions, the rare occurrence of laryngeal spasm, hypoxia, shock, mergence delirium, and vomiting, and the absence of disturbance of respiratory rhythm. The main disadvantage was the time required for the anesthetist to go to the ward and give rectal instillation, for it was considered necessary that the patients be watched from the time of administration of the pentothal until they regained consciousness, which increased the nursing care.

Pentothal given by rectum was considered indicated for surgical procedures in children weighing under 75 pounds, and in those over this weight who were unsuitable for venipuncture. By supplementing the basal state with nitrous oxide and oxygen, sufficient analgesia was obtained to reduce simple fractures and to suture lacerations.

The technique was contraindicated in patients who did not have control of the rectal sphincters.

Respiratory obstruction was another contraindication, and relative contraindications were anemia and disease of the lower bowel and of the liver and kidney.

One hour preoperatively atropine sulfate was administered by hypodermic injection. The dosage of pentothal employed was 0.2 c.c. of a 10 per cent solution per pound of body weight. The depth of basal anesthesia was assessed by gentle supraorbital pressure, or pressure on the ear cartilage. Narcosis was never deep enough to prevent a response to this stimulus. Induction was carried out with whatever agent or technique the anesthetist deemed advisable: open drop ethyl ether, open drop divinyl ether followed by ethyl ether, nitrous oxide, ethyl ether and oxygen, nitrous oxide and oxygen, or pentothal.

Operations performed included all surgical specialties other than thoracic surgery. Tonsillectomy was performed in 103 patients. In 238 of the 300 patients the basal state was classified as good with the patient asleep, and there was no response to stimuli other than pain; 56 cases were classified as fair, and 6 as failures. The optimum time for administering rectal pentothal was found to be 30 minutes before operating time. Rectal irritations, and signs of toxicity or intolerance to the drug were absent. The postoperative course was uneventful. The children became conscious in from 30 minutes to 2 hours without delirium. The incidence of vomiting was 25.76 per cent as compared with 60 per cent in a group of 150 patients who received morphine and atropine as premedication, and 38.53 per cent in 150 patients who received atropine only as premedication. It was found that less ether was required to maintain satisfactory levels of anesthesia when basal narcosis with pentothal was used. MARY KARP, M.D.

The Use of Myanesin in Anesthesia (L'impiego della mianesina in anestesia). FRANCESCO BAISI. *Policlinico*, sez. prat., 1948, 55: 901.

In the attempt to find a substitute for curare, Berger and Bradley of England studied the glycerites of ether and it was found that several of these substances provoked relaxation of the skeletal muscles in animals. Of these, myanesin (3-ortho-toloxy-1, 2 propanediol) proved particularly active therapeutically and was found to possess a wide margin of safety. The substance is stable, may be sterilized by heating, and may be mixed with a solution of sodium chloride, glucose, and with derivatives of barbituric acid. The author has used myanesin exclusively by the intravenous route, either associated with pentothal or with local anesthesia. It has also been employed together with pentothal in the induction of ether anesthesia, and has been given in association with pentothal anesthesia to relax the laryngeal spasm complicating the use of pentothal as an anesthetic agent. The recommendations of Mallison regarding the manner of employing this agent have been followed; however, the large doses (50 c.c.) as proposed by that author were not given.

There seems to be a synergistic relationship between pentothal and myanesin, so that less pentothal may be used or the anesthetic period can be lengthened out considerably with the same amount of pentothal. With myanesin there is no such discomfort as accompanies the use of curare and none of the paralytic accidents. The only drawback in the use of the former has been a cerebral form of vomiting which lasted a couple of days following the operation. This vomiting has been particularly bothersome when the patient was operated upon while conscious (local anesthesia and myanesin).

Myanesin does not affect the indications for curare; the latter will still be used in operations on the chest in which an absolute arrest of the motions of breathing is desired, and myanesin will find its field of usefulness in abdominal surgery where its peculiar efficacy in relaxing the abdominal musculature is valuable. JOHN W. BRENNAN, M.D.

The Action of Curare in Anesthesia (A acção do curare em anestesia). VIRGÍNIA DE ABREU. *Gaz. méd. Portuguesa*, 1948, 1: 299.

The author states that clinically 1 mgm. of Burroughs Wellcome's tubarine produces the same effect as 6.6 mgm. of Squibb's intocostrin. Curare is a safe drug to use in combination with certain anesthetic agents, and its association with cyclopropane is regarded as giving an ideal anesthesia. With ether, the dose of curare must be reduced one-third because ether itself has a curariform action. The advantages of curare in anesthesia are that it provides optimal muscular relaxation and thereby facilitates abdominal surgery, avoids laryngeal spasm, allows the giving of small amounts of anesthetic to maintain the anesthesia on a superficial plane, and permits control of respiration in thoracic surgery. The patient wakes up a few minutes after the operation, and vomiting with its pulmonary complications are thus avoided or reduced to a minimum.

In thoracic surgery, Cecil Gray administers part of the curare before induction of anesthesia; this serves not only to verify the effect of the drug on the patient but also to facilitate endotracheal intubation since laryngeal spasm is eliminated. This technique gives excellent results with any type of endoscopy. Thus, when intending to use 15 mgm. of tubarine in adults, 5 mgm. are administered and 3 minutes are allowed for observation of the reaction of the subject; if it is normal, the remaining 10 mgm. are injected and the barbiturate is then given. The pulse, heart, and respiration must be constantly watched. Oxygenation in bronchoscopy is easy since the oxygen can be connected with the instrument. Patients wake up at the end of 10 minutes. To shorten the action of curare, 5 mgm. of prostigmine with 0.5 mgm. of atropine are given intravenously.

In prolonged operations, as on the lungs, the best anesthesia consists of nitrous oxide, pentothal, and curare in sufficient dosage to cause apnea. The endotracheal tube and a closed circuit must be used to control respiration. No more than 1.5 gm. of pentothal and 30 mgm. of curare should be used, and 0.1 gm. of pentothal and from 2 to 4 mgm. of

curare are given from time to time. Twenty milligrams of tubarine are enough to obtain paralysis of the diaphragm, the action lasting 40 minutes or more. Naturally, reactions vary greatly from individual to individual, as they depend on the condition of the subject and on the length of the operation. There are even patients who respond with excellent muscular relaxation to 5 mgm. of curare.

Curare and cyclopropane have been used in numerous cases of cesarean section with satisfactory results since curare does not depress the child and allows a decrease in the amount of anesthetic used.

As the barbiturates are precipitated with curare, the two drugs should never be administered through the same needle unless some saline solution is passed through it.

The use of curare is contraindicated in myasthenia gravis. RICHARD KEMEL, M.D.

Effect of Procaine on Liver Function. An Experimental and Clinical Study. J. J. JACOBY, J. M. COON, M. P. WOOLF, P. R. SALERNO, and H. M. LIVINGSTONE. *Anesthesiology*, 1948, 9: 481.

Because of the increasing popularity of the intravenous administration of procaine, and because the liver seems to be the principal site of detoxification of this drug, these experiments were planned to test the acute and subacute effects of massive doses of procaine on the liver. Rats and dogs were subjected to repeated large but sublethal doses of procaine hydrochloride. Histologic examination of the liver, spleen, heart, and kidney of the rats, and liver function tests in all animals revealed no evidence of damage.

Liver function tests following the intravenous administration of procaine to human beings for the control of postoperative pain showed no evidence of liver damage. It appears that the administration of moderate doses of intravenous procaine ordinarily employed for the control of postoperative pain is not harmful so far as the effect upon the normal liver is concerned. A previously damaged liver, however, may respond in a different manner and investigations dealing with this problem are under way.

MARY FRANCES POE, M.D.

SURGICAL INSTRUMENTS AND APPARATUS

Modern Architectural Conception of Operating Room Suites (Conception moderne des groupes operatoires). F. MASMONTEIL. *Rev. chir.*, Par., 1948, 67: 236.

The author begins his article by saying that the architecture of operating suites is being fully revised. The main revision which must be undertaken in all climates is the creation of an atmosphere approaching absolute asepsis. Surgery under the shield of antibiotics is a fortunate, but palliative, conquest. It is better to operate without organisms than with neutralized organisms. Unfortunately for the great majority of surgeons, sterilization of the air in the operating room is still a problem of secondary importance. For the past 10 years the author has operated in a sterilized atmosphere and he states that major surgery performed in an aseptic operating room has become almost minor surgery, as far as infection is concerned. To obtain such asepsis of the air everything must be considered; the disposition of the rooms, their shape, their size, their equipment, and the ventilating system.

The modern operating room must be of restricted dimensions. The ideal dimensions are approximately 6 by 4.5 meters and 2.20 meters high, giving a displacement of 60 cubic meters. Demirleau has reduced the dimensions to 40 cubic meters. In order that students and visitors may observe, a gallery is built above the operating room, with a transparent air-tight partition.

The operating room must not open directly on the halls, but must be separated from them by an adjoining room, which is used for anesthesia. Moreover, the operating room must not serve as a hall to the sterilization room.

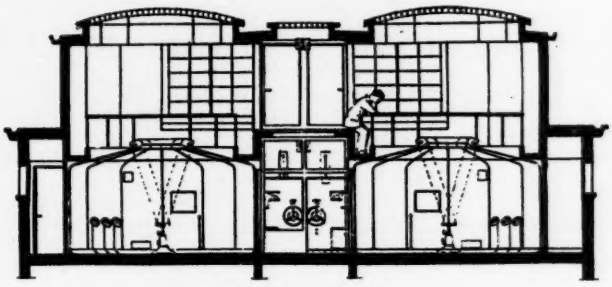
The shape of the operating room is not immaterial. While hard to ventilate, the eliptical room is to be preferred to the rectangular or circular rooms. The floor of the room must be sloped for drainage and be of a tilelike material, and the heat radiation must be outside the room (Fig. 1).

The lighting must be athermanous, and the author recommends that the lighting equipment include a rheostat.

The ventilation has been the subject of extensive studies. The contamination of operating room air comes from two sources: (1) the agitation of the air when the patient is wheeled into the room, or when the operating team moves in, and (2) the emission of bacteria from the throat and nose of the occupants. The latter source is the most active and the most difficult to neutralize. The mask interferes with the propulsion of large particles into the operative field, but does not in any way interfere with their diffusion in the atmosphere. To obviate this, the author has devised a ventilating system designed to catch such bacteria at their source and direct them upwards or downwards through air shafts to the filters of the sterilizing machine. For this purpose, in the ceiling are built openings with valves to aspirate the contaminated air, while at the periphery of the room are the openings for the entrance of sterilized and conditioned air. The efficiency of this new ventilation is undisputable. The author placed Petri dishes in several places in the operating room and found that the contamination of the air was reduced to 2 and 4 colonies.

The operating rooms should be grouped two by two and should be preceded by rooms for anesthesia.

The sterilizing room should be behind the operating rooms and should communicate with the latter through apertures opening only from the operating room side. GERARD GAGNON, M.D.



Coupe transversale Y-Z

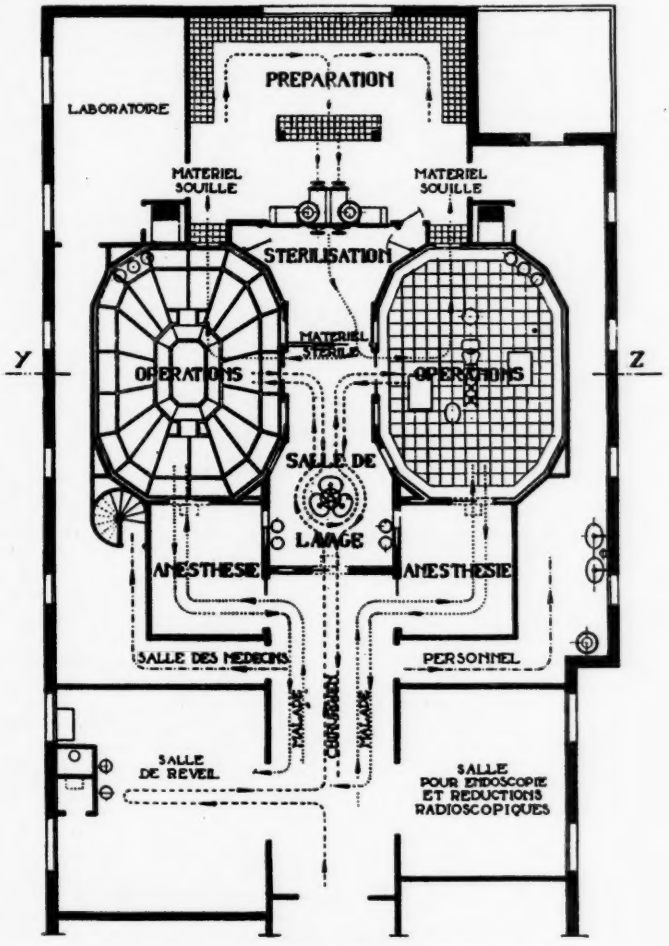


Fig. 1. Diagram of the surgical block of Dr. Masmonteil.

PHYSICOCHEMICAL METHODS IN SURGERY

ROENTGENOLOGY

The Roentgen-Ray Examination of the Paranasal Sinuses with Particular Reference to the Frontal Sinuses. SÖLVE WELIN. *Brit. J. Radiol.*, 1948, 21: 431.

Because of the difficulty of clinical examination of the frontal sinuses, the author emphasizes the need for a roentgen technique which will overcome, in turn, some of the difficulties encountered in the interpretation of roentgenograms of these structures. He presents diagrams and roentgenographic reproductions to show the positions used in sinus radiography at the Caroline Hospital of Stockholm. Most of these are made with a horizontal beam and conform to popular techniques employed in this country, but two unusual positions for the frontal sinuses are described in detail.

One of these is a modified submentovertical view which he calls the "overshot axial projection." It is made with a vertical beam, with the head so hyperextended that the region of the frontal bone just posterior to the hairline is in contact with the film-holder, thus placing the radiographic baseline at an angle of 40 degrees to the film. This projects the anterior and posterior walls of the frontal sinuses through the maxilla posterior to the symphysis of the mandible. The view is stated as being particularly valuable in comparing the relative thicknesses of the walls of the sinuses on each side. One set of roentgenograms is reproduced, and indicates in the standard projections that one frontal sinus is either absent or its lumen is completely occluded. The "overshot axial view," however, clearly reveals the appearance to be due to a marked right-left variation in thickness of the walls of the sinuses.

The other unusual projection is essentially a lateral decubitus view with the head in the Caldwell position, the image being projected by a horizontal beam. Convincing illustrations are included, which show how this position, if done with both right and left sides down, will reveal the presence of fluid levels which would otherwise scarcely be suspected. The author describes and illustrates an ingenious little film marker which, he states, will unfailingly show which side is lowermost in this position. He explains that small amounts of fluid are best visualized in the lateral extent of the frontal sinus in this "decubitus" position whereas if the volume of fluid is large in proportion to the contained air, the fluid is best seen collected against the medial septum of the sinuses. The latter view is used only to clarify doubts after routine examination. PAUL W. EYLER, M.D.

Pneumoencephalography in Cerebellar Atrophies. L. UZMAN. *Am. J. Roentg.*, 1948, 60: 293.

Cerebellar atrophy is usually observed in males of middle age. The most common clinical findings are a staggering gait with a broad base, and tremor of the head and extremities.

A pneumoencephalogram usually shows slight enlargement of the ventricles of the brain without displacement, the cortical subarachnoid pathways appear to be slightly enlarged, and the basal cisternae are enlarged. Characteristically there is marked enlargement of the cisterna cerebellomedullaris (cisterna magna), an excess collection of air under the tentorium, and widening of the cerebellar sulci.

VERN W. RITTER, M.D.

Miliary Calcification of the Lung: Etiologic Aspects. HOWARD P. DOUB. *Radiology*, 1948, 51: 480.

Early writers believed that miliary calcifications of the lungs represented a healed stage of miliary tuberculosis. The author reviews the literature which contributes to this belief. He also reviews the more recent literature indicating that in patients with tuberculin-negative miliary calcification, frequently the cause of calcification is either histoplasmosis or coccidiomycosis, and both of these conditions tend to exist in endemic areas in the United States. More recently it has been found that Aspergillus and Monilia may cause pulmonary disease characterized by miliary bilaterally spread lesions.

The author presents the case of a family consisting of a mother and 4 children with chronic respiratory disease which was characterized by miliary lesions. Cultures from bronchoscopy secretions showed Monilia in 2 cases, and the others had Aspergillus by culture. These cases were followed for 10 years and roentgenograms were made at yearly intervals. All patients recovered completely with smooth, densely calcified miliary lesions of the lungs.

The author suggests that miliary tuberculosis of the lungs may have a similar end result in some instances. Two cases supporting this view are also presented. JANE C. MACMILLAN, M.D.

Idiopathic Pulmonary Fibrosis: Roentgenologic Findings. LAURENCE L. ROBBINS. *Radiology*, 1948, 51: 459.

Idiopathic pulmonary fibrosis is found in the small group of cases in which no one factor can be found to cause the generalized fibrosis of clinical significance. This, then, excludes inflammatory processes such as tuberculosis, syphilis, and bronchiectasis; also radiation, asthma, pneumoconiosis, and the rarer processes associated with Raynaud's disease, scleroderma, and periarteritis nodosa.

The author presents 16 photographs of roentgenograms of the chest, and, on the basis of the fluoroscopy, followed by a posteroanterior roentgenogram, with lateral and both obliques when indicated, gives a very definitive discussion of the roentgenological appearance of pulmonary fibrosis. The statement is made that idiopathic pulmonary fibrosis is, as a

rule, a diffuse process. In its early stages, it may not be distinguishable from numerous other processes. In its later stages, the most common roentgen appearance is that of a generalized process with more or less systematically arranged areas of fibrosis interspersed with areas of emphysema. Accurate diagnosis requires correlation of clinical, pathologic, and roentgenologic findings.

JANE C. MACMILLAN, M.D.

Acute Obstruction of the Small Intestine. IRA H. LOCKWOOD, ARTHUR B. SMITH, and JOHN W. WALKER. *Radiology*, 1948, 51: 310.

The authors correlate the roentgenologic findings and the clinical picture in acute obstruction of the small intestine, and outline a course of successful management. They were induced to do this by the fact that an analysis of 100 consecutive cases revealed that death occurred in no less than 15 instances, whereas, with the exception of one patient, all should have been saved.

The management is divided into 5 phases: (1) speedy and accurate diagnosis; (2) decompression; (3) restoration of physiological equilibrium; (4) surgery; (5) postoperative management.

1. If intestinal colic (with borborygmi at the acme of pain) and vomiting are present, and when the abdomen is distended, it is imperative that a plain film of the abdomen be obtained immediately. A roentgenogram can give not only the site and degree of the obstruction but often furnishes information regarding the type. In mechanical obstruction a loop (or loops) of gut is distended with gas, the degree of distention depending upon the site of the lesion and the duration and degree of obstruction. In ileus the gas lies in multiple pockets; it "stops where it may." In the former, the "green light" is given for immediate surgery, in the latter a decompression is recommended.

In conjunction with the mechanical obstruction, the authors stress certain roentgenologic signs which are pathognomonic of gangrene or embarrassment of blood supply of the bowel. One of these signs is the visualization of a smooth-walled tube distended with gas. The picture corresponds to a single loop of bowel distended with gas but which, in view of loss of tone and edema, has become completely void of its physiological pattern. Another sign has to do with the geometrical pattern of the gut. Single or multiple "C-shaped" loops of small bowel arising from a common source or pedicle always indicate a volvulus. This pattern is accompanied by a loss of the valvulae conniventes, the extent of which is proportionate to the degree of embarrassment of the blood supply.

The authors consider roentgenography of the abdomen as an absolute emergency, day or night. When the examination reveals obstruction of the small bowel, the patient is operated upon immediately. This avoids the phase of distention.

2. When, however, distention has progressed to the stage at which surgery seems unwise, decompression is undertaken. The type of decompression is an age-old controversy. The authors themselves believe that only the Miller-Abbott tube should be used, and this only as an adjunct to eventual operation. The procedure was resorted to 39 times in the 100 cases of intestinal obstruction, with a single failure.

The technique of passing the tube, which must be handled by the department of radiology, is described in considerable detail. A warning is sounded against overexposure to roentgen rays in inexperienced hands.

3. The restoration of the electrolyte balance of the patient is important. Not only the chloride levels, but also those of the nonprotein nitrogen and, particularly in the aged, of the serum proteins must be known. The repeated use of whole blood and plasma, preoperatively and postoperatively, is necessary to re-establish the electrolyte and protein balance.

4. The technical aspects of the surgical intervention are beyond the scope of the present article. A statistical compilation of the cause of obstruction revealed that postoperative adhesions were to blame by far the most commonly. All patients who died, with the exception of one, had histories of over 72 hours duration. Gangrene of the bowel and resection contributed greatly to the seriousness of the case.

5. The postoperative management closely follows that used generally. The average hospital stay was 18.5 days, including the period of preoperative intubation.

The article is well illustrated with typical roentgenograms.

T. LEUCUTIA, M.D.

On the Roentgen Aspect of Prostatic Cancer on Urethrocystography. NILS P. G. EDLING. *Acta radiol.*, Stockh., 1948, 29: 461.

The author reports the findings in urethrocystography in 68 proved cases of carcinoma of the prostate studied at the Caroline Hospital in Stockholm, and compares them with the findings in a similar number of cases of benign prostatic hypertrophy, also histologically proved. The two groups of cases covered essentially the same age group—from the middle forties to the middle eighties, with the highest rate of disease in the seventh and eighth decades.

The roentgenograms were made during the injection of water soluble contrast material into the anesthetized urethra at a time when the bladder had begun to fill. Frontal and both right and left oblique views were obtained, and in some cases micturition views were attempted.

Study of the films showed that elongation of the prostatic urethra combined with narrowing and irregular deformity of the lumen, abrupt kinking of the luminal course, displacement laterally or anteriorly of the entire prostatic urethra and irregular bulgings into the base of the bladder, formed a rather characteristic picture in carcinoma of the prostate. The urethrocystogram may, of course, fail to show several or all of these signs in spite of good clinical evidence of carcinoma of the prostate. This

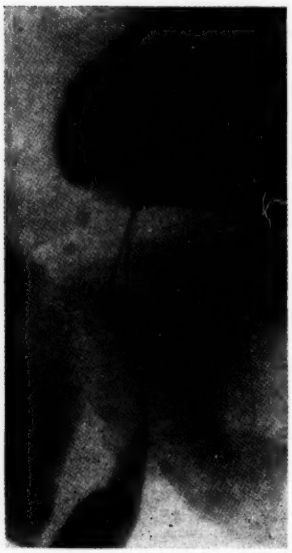


Fig. 1. (Edling) Prostatic cancer (hard prostate, osteoplastic metastases in spinal column and pelvis). Displacement of the entire prostatic urethra forward and to the right.

is true particularly of lesions located far posteriorly. Most of the 68 cases of carcinoma, however, showed some change in the urethrocystogram. For example, there was elongation of the prostatic urethra in 66 cases, narrowing of the lumen (mostly supracollicularly) in 42, deformation of the lumen in 63 cases, angulation in 45, displacement of the entire prostatic urethra in 30, and irregular bulging into the base of the bladder in 25.

Elongation of the prostatic urethra also occurred in the cases of benign hypertrophy, but was less likely to involve its whole length, and was commonly associated with a ribbonlike compression of the lumen, and in some cases with smoothly curving impressions of the urethra and base of the bladder rather than with irregularly distorted urethral narrowing and kinking as seen in carcinoma. Anterior angulation of the urethra occurred in both conditions but was more pronounced in carcinoma. Lateral displacement of the whole prostatic urethra was seen in nearly half of the carcinoma cases (Fig. 1) but in none of the hypertrophic ones. Trabeculation of the bladder and diverticulum formation occurred with about equal frequency in both conditions, and occasionally prostatic calcification and cavity formation were found in both.

The author also found that some cases showed a combination of urethral changes suggestive of the presence of both carcinoma and hypertrophy. While this adds to the difficulty of roentgen differentiation, it is to be expected in some cases since it is not uncommon for a carcinoma to arise in a hypertrophic prostate. It was noted that the urethrocystographic signs here considered suggestive of prostatic carcinoma could be well imitated by the local changes residual to an electroresection for benign hypertrophy, and the author therefore stresses the importance of possessing a trustworthy clinical history before attempting to interpret the films.

Finally, micturition films were obtained in 20 cases of prostatic carcinoma. Sixteen of these showed some decrease in dilatability of the prostatic urethra, but 4 of them showed good dilatability although the injection views gave distinct signs of malignancy. Hence it was concluded that micturition dilatability does not have universal value as an early sign of prostatic cancer. LILIAN DONALDSON, M.D.

Irradiation of Pituitary Tumors. H. DABNEY KERR. *Am. J. Roentg.*, 1948, 60: 348.

The author discusses the diagnosis and irradiation of pituitary tumors. He reports his findings in a follow-up survey of 25 cases presented in 1941, and reviews an additional series of 30 cases.

Acidophilic tumors of the pituitary body are usually suspected because of a disturbance in hormonal growth activity. There is roentgenographic evidence of enlargement or erosion of the sella turcica in about 60 per cent of the cases. The signs and symptoms of chromophobic cell tumors are chiefly headache, visual disturbance, or hypopituitarism, due entirely to pressure on surrounding cells or structures. Usually the rare basophilic adenoma is small; it does not enlarge the sella turcica and causes the well known Cushing's basophilism. It must be differentiated from certain adrenal tumors that produce a similar clinical syndrome.

The author believes that all types of pituitary tumors—acidophilic, basophilic, and chromophobic—should receive primary irradiation. The exceptions are those cases in which it is suspected that the tumor is cystic in type, cases in which there are symptoms suggesting hemorrhage into the tumor, or the presence of increased intracranial pressure. Patients who do not show adequate response in 2 months should be operated upon, and patients operated upon primarily should receive postoperative irradiation to cause regression of the remaining remnants of the tumor.

Treatment is given using factors of 200 kilovolts, 1.95 mm. of copper, half-value layer, 50 cm. distance, through four 5 cm. circular fields directed toward the sella turcica—2 temporal, 1 frontal, and 1 vertical. A small dose of 100 roentgens is given to one field on the first day and if no reaction ensues, two fields are given 100 roentgens each the second day, and from then on 200 roentgens to each of two fields daily to a total of 2,000 roentgens per field (air dose). This delivers approximately 2,400 roentgens into the pituitary fossa in the average sized calvarium.

An over-all good and apparently permanent result in 70 per cent of this series of 55 cases indi-

cates that irradiation is a very satisfactory primary method of treatment. Chromophobic tumors responded as well as the acidophilic type. Although there was a suggestion of possible brain injury in one or two cases following intensive pituitary irradiation, there was no proof that such occurred.

JOHN H. FREED, M.D.

Pathology of Pulmonary Fibrosis, Including Chronic Pulmonary Sarcoidosis. TRACY B. MALLORY. *Radiology*, 1948, 51: 468.

The author states that, in contrast to emphysema, pulmonary fibrosis is an uncommon disease, having been diagnosed at the Massachusetts General Hospital 59 times in 6,000 autopsies as multifocal or generalized involvement of dubious origin. In only 23 of these cases was the severity of the condition of clinical importance.

Widespread fibrosis of the lung interferes with normal pulmonary function by increasing the collagen which is associated sooner or later with diminished elasticity of the lung and decreased efficiency of ventilation. With the loss of respiratory function of a large part of the alveolar tissue, two conditions develop: (1) a disproportion between thoracic and pulmonary volumes, leading to emphysema, bronchiectasis, or both, and (2) a decrease in the vascular bed, resulting in pulmonary hypertension and cor pulmonale. Pulmonary fibrosis, therefore, may produce either the symptoms of pulmonary insufficiency or of right-sided heart failure. The reserve factor, however, is very great.

The most frequent of the pathogenetic types of the condition are (a) bronchial asthma, (b) x-radiation of the chest lesions, and (c) sarcoidlike lesions. A detailed discussion is given of each of these types.

The author states that the incidence of organized pneumonia in patients with chronic bronchial asthma is too high to be a coincidence, and that radiation pneumonitis is complicated by scars of necrotizing pneumonitis and healed neoplasia. A progressive form of granulomatous pneumonitis healing by fibrosis is described, and the author's evidence for considering this a form of localized pulmonary sarcoidosis is presented. Ten photomicrographs are included.

JANE C. MACMILLAN, M.D.

Treatment of Deep-Seated Malignant Tumors with Multiple Port Technique Simulating Rotation Therapy. IRA I. KAPLAN and SIDNEY I. ETKIN. *Radiology*, 1948, 51: 188.

The authors recommend the use of 12 narrow rectangular portals placed 1 cm. apart and girdling the entire chest, for irradiation of advanced carcinoma of the esophagus and inoperable pulmonary neoplasm. By such multiple port technique they believe a homogeneous carcinocidal dose of 200 kv. roentgen rays can be delivered to the tumor while sparing the skin and peripheral intrathoracic structures to a greater degree than with methods in which fewer portals for cross-firing are employed. The disadvantage of the method is that a large volume of normal tissue must be irradiated; hence, the tumor dose which can be administered is limited by the total energy absorption which the patient will tolerate.

The location and extent of the tumor is determined by teleroentgenography with the patient in posteroanterior and true lateral positions, and then at fluoroscopy indicators are fixed front and back, directly over the center of the lesion. The twelve portals are then outlined on the skin around the chest. Each field must be wide enough for the beam passing through it to cover the whole breadth of the tumor, and long enough to extend well beyond the periphery of the gross lesion in order to catch the creepers spreading up and down the wall of the esophagus. Fields 7 by 15 cm. were found satisfactory for most esophageal and pulmonary hilar neoplasms. Within these narrow portals the beam must be angled with exactitude to allow cross-fire exactly on the tumor, and for accuracy in angling the authors recommend use of the Demy protractor, which also allows easy determination of the tumor-skin distance for each portal. When the esophageal tumor is situated behind the clavicles, projection of the shoulders makes the lateral fields useless. In such cases, 1 central portal and 2 to each side of it are placed front and back, giving 10 fields, and then 4 portals 5 by 5 cm. in diameter are added at the root of the neck through which the beam is directed slightly downward.

It is assumed, from what is known of tumors of histology similar to those of the esophagus, that a tumor dose of 5,500 to 6,500 roentgens delivered within 4 to 5 weeks is the approximate sterilizing dose. The factors used in the cases here reported were 200 kv., 20 ma., 50 cm. distance Thoraeus filtration with high value layer 1.9 mm. of copper.

Supportive care of the patient is stressed, particularly adequate nourishment. Intramuscular administration of 50 mgm. of pyroxidine, 1 hour before and again 1 hour after treatment, was found very useful in preventing radiation sickness. Weekly blood counts gave the first indication of falling tolerance to large volume irradiation, but mild leucopenia developed in only 2 of the 8 cases presented, and in spite of large daily doses, all patients remained ambulatory during treatment.

The authors report their results with this method in 4 cases of advanced carcinoma of the upper or midesophagus, proved by pretreatment biopsy, and in 4 cases of carcinoma of the lung found inoperable at previous thoracotomy. In each of the cases of esophageal carcinoma, the patient's dysphagia was improved within 2 weeks of initiation of treatment and had disappeared by the time treatment was completed. The roentgen appearance of the esophagus greatly improved, for its wall became mobile again, the rugal pattern linear, and only slight narrowing remained to mark the site of lesion. However, within 2 to 5 months after the beginning of treatment, the first 3 patients developed dyspnea, chills, low grade fever and rales, and showed film

evidence of pulmonary infiltration spreading from the hila. Within a few more weeks they died, apparently of radiation pneumonitis. In the one case in which an autopsy was obtained the pathologist could find no evidence of residual esophageal neoplasm.

It was evident that some change in the method of administering the treatment must be made. These 3 patients had received tumor doses of 5,800, 6,170, and 8,147 roentgens, respectively, in 23 to 30 days, 2 adjacent portals having been treated daily in rotation around the chest, with each portal receiving 600 roentgens in air (750 r. with backscatter) per treatment. The daily tumor dose under this method was estimated at 250 roentgens. It was decided that the daily tumor dose could be reduced to 165 to 170 roentgens, each portal receiving only 300 to 360 roentgens in air, and that two opposite portals should be used daily instead of two adjacent ones in order to avoid creation of a "hot-spot" due to overlapping of beam pathways within peripheral tissue. These changes increased the total treatment time required to achieve the desired tumor dose from just over 3 weeks to about 5½ weeks.

The fourth patient with esophageal carcinoma was treated by this modified method. The depth dose achieved in 35 days was estimated at 6,300 roentgens. This patient made the same initial clinical and roentgen improvement in the esophagus as had the previous patients, but so far he had not developed signs of pneumonitis. In the 4 months of observation he had gained 22 pounds in weight and had returned to work.

For the 4 cases of inoperable carcinoma of the lung presented, the girdle distribution of portals had to be modified to allow for the eccentric position of these tumors, 2 of which were in a main stem bronchus, the other 2 in an upper lobe. One patient, a man only 48 years of age, received a tumor dose of 7,532 roentgens in 30 days at the rate of 600 roentgens in air per portal, but the other 3 patients were treated by the modified method recounted above to achieve tumor doses of approximately 6,200 roentgens in a little over 5 weeks. Their chest pain disappeared during treatment, slight weight gain ensued, and in each instance the roentgen appearance of the chest became spectacularly improved with only mild pulmonary scarring and pleural thickening remaining visible. At the time of this report, 8 months, 7 months, 4 months, and 2½ months, respectively, after initiation of roentgen treatment, these 4 patients were all working and maintaining their weight.

The authors present this multiple portal technique as one which offers hope of substantial palliation in advanced esophageal and inoperable pulmonary carcinoma provided care is taken to avoid severe radiation pneumonitis. They recognize that the elapsed time is as yet too short to allow evaluation of the possible duration of the palliation or to indicate whether any cure is possible.

LILIAN DONALDSON, M.D.

Observations upon the Lymphopenia of X-Ray Irradiation. C. H. G. PRICE. *Brit. J. Radiol.*, 1948, 21: 481.

The author's article is based on cases observed at the University of Bristol and the Bristol Royal Hospital in England. A mathematical correlation was demonstrated between radiation dosage and response of the total lymphocyte count in a group of 16 women receiving a standardized course of pelvic irradiation, in most of the cases for carcinoma of the ovary. All patients were in good general condition, and were free of any clinical evidence of lymph node or bone marrow involvement.

The irradiation factors used were 220 kilovolts, a filter of 1 mm. copper plus 1 mm. of aluminum, giving a high value layer of 1.6 mm. of copper administered through two anterior oblique and one posterior direct pelvic portals, at a constant time of day daily, for 5 successive days each week, and at a constant daily dose, to achieve a total tumor dose of between 2,800 and 3,500 roentgens for each patient. The pretreatment level of the total lymphocyte count was first established, and then differential counts were made daily, 5 hours after each treatment, using Leishman-stained films of single celled depth. A minimum of 400 cells arranged in battlement distribution along film edges were counted in each film.

From the daily lymphocyte total, mean totals for the 5 day periods were calculated and plotted against time in days, producing in each case a curve showing the greatest change in total lymphocyte count in the initial 14 days of treatment, following which the rate of change diminished fairly rapidly to a minor order For each patient, the curve so obtained was similar.

When curves were re-plotted upon logarithmic graph paper, and an attempt was made to fit a straight line to the observed points on the graph, it was found that there was a general tendency for the earlier two or three points to be above the line which best fitted the rest of the values, so that the mathematical expression correlating the total lymphocyte count with the integral dose appeared to be a composite one having the general form, $C = A10^{-k_1 D} + B10^{-k_2 D}$, where C = per cent survival of total lymphocytes for values of D; A = a proportion of the total lymphocyte count which appeared to diminish less rapidly than the component 100-A; B = 100-A; k_1 and k_2 = indices representing the rate of diminution of the two components A and B; D = integral dose in megagram-r.

The values for all of these functions were calculated for each of the 16 cases. It appeared that the value of component B in the integral dose curves was mainly responsible for the major change in total lymphocyte count that takes place during the early days of a course of treatment. The author suggests that this component may represent the result of the direct action of the radiation, and that the further but smaller drop in lymphocyte count represented by component A may be due to an indirect action of radiation. After several weeks a stage is reached at which further irradiation, at the level of dosage used

in these cases, causes only a very small change in lymphocyte count.

Clinical assessment of tolerance (good, fair, or poor) to x-irradiation revealed no correlation between age, initial or final lymphocyte count, the rate of change of total lymphocyte count, the total dose of radiation, or the rate of dosage. The author therefore concludes that the total lymphocyte count from a quantitative point of view is not a good index of tolerance to radiation, although its characteristic pattern of change under standardized conditions offers an approximate index of the degree of radiation dosage. LILIAN DONALDSON, M.D.

MISCELLANEOUS

Radioactive Iodine: Its Use as a Tool in Studying Thyroid Physiology. RULON W. RAWSON and BENGT N. SKANSE. *Radiology*, 1948, 51: 525.

Three types of radioactive iodine have been used in the study of thyroid function; I^{128} with a half life of 25 minutes, I^{130} with a half life of 12 hours, and the more practicable I^{131} with a half life of 8 days.

The earliest studies, in 1938, by Hertz and others showed that hyperplastic thyroids concentrated a greater percentage of radioactive iodine than the normal controls.

Anatomical changes in the thyroid have also been studied. The first changes observed in an animal receiving thyroid stimulating hormone were hypertrophy of the thyroid cell and a loss of thyroid iodine.

Oral radioactive iodine is rapidly absorbed by the gastrointestinal tract and is demonstrable in the thyroid within 20 minutes. Most of the material (80%) is excreted during the first 5 days in urine. Hypothyroid patients collect very little iodine. Myxedematous patients excrete from 85 to 90 per cent of the iodine in the first 24 hours. The excretion rate is slower than in normals.

Benign tumors collect iodine whereas malignant thyroids do not collect radioactive iodine. In those cases of thyroid cancer in which the primary tumor was removed surgically, or was destroyed by radioactive iodine, the sites of distant metastases were shown to have a definite affinity for iodine.

The studies carried out by these authors indicate a definite need for determining the minimum tracer dose so that there may be no interference with normal thyroid function. MAURICE D. SACHS, M.D.

Treatment of Hyperthyroidism with Radioactive Iodine (I^{130}, 12-Hour Half-Life, and I^{131}, 8-Day Half-Life). EARLE M. CHAPMAN, BENGT N. SKANSE, and ROBLEY D. EVANS. *Radiology*, 1948, 51: 558.

The authors treated 65 hyperthyroid patients between 1943 and 1947 with radioactive iodine having a half-life of 12 hours, isotope I^{130}. Between August, 1946 and the present time, another 65 were treated with 8-day isotope, I^{131}. Radioactive iodine I^{130} with a half life of 12 hours has been used effectively, alone, in a single retained dose averaging 20 millicuries per estimated gram of thyroid, 90 per cent of whose radiation dose is delivered in the first 36 hours. Myxedema has been produced. The histologic changes seen in the thyroids 1 and 2 years after treatment show fibrosis and regenerative hyperplasia according to the unanimous judgment of 5 pathologists. Relapse or recurrence of hyperthyroidism has not been observed. Toxic effects of this short-lived form of radioactivity have been nausea, slight fever, and swelling and tenderness of the thyroid for a few days. Effective doses in the second and fifth months of pregnancy have not caused cretinism. Radioactive iodine I^{131} with a half-life of 8 days is an effective single therapeutic agent. In 41 of the patients who responded, the average retained dose was 0.142 millicuries (142 microcuries) per estimated gram of the thyroid tissue; 97 per cent of this dose of radiation is delivered in 30 days. In most cases, the administered effective dose was from 8 to 14 millicuries by mouth. Myxedema has been produced in only 4 cases. The only histologic study as yet available is from a gland removed at autopsy only 19 days after treatment. The gland shows edema and separation of the cells from the basement membrane, but no fibrosis. Toxic effects of treatment with the 8-day isotope may be related to an exacerbation of the thyrotoxicosis that sometimes occurs in the first 1 or 2 weeks following treatment, during which time the release of stored thyroid hormone may be reflected in the rising blood protein-bound iodine.

FRANK L. HUSSEY, M.D.

Radioactive Iodine Studies of Functional Thyroid Carcinoma. VIRGINIA KNEELAND FRANTZ, EDITH H. QUIMBY, and TITUS C. EVANS. *Radiology*, 1948, 51: 532.

In 1940, Hamilton Foley reported the results of his studies on the deposition of radioactive iodine in human thyroid tissue. The article was accompanied by radioautographs of two thyroid carcinomas which failed to take up radioactive iodine. Foley concluded, therefore, that it was inadvisable to treat such lesions with radioactive elements. However, since there are different types of thyroid cancer, it is still possible to consider the treatment of these lesions.

A 20 year study (1924–1944) of 4,707 thyroids revealed 151 cases of cancer. Three-fourths of 139 primary cancers of the thyroid studied up to June 1, 1947 were slow-growing lesions with late metastasis. In this group the papillary and adenomatous, or follicular, types of lesion were equally divided. Papillary lesions are multiple, with local invasion, and they metastasize to the lymph nodes and lungs, but not to the bone. The adenomatous or follicular type of tumor appears to be benign histologically, usually occurs singly, is encapsulated, with spread to the bone (not to the lymph nodes), and to the lungs only late in the disease.

All patients with thyroid enlargement in whom malignancy is suspected receive a presurgical tracer dose of radioactive iodine; thyroid uptake and urine output are measured. At the time of surgery the gross specimen is examined *in situ* by the surgeon

and pathologist. The type of surgical procedure is then determined. Portions of the tissue are measured directly with the geiger counter and radioautographs are taken if necessary.

Up to May, 1948, a total of 68 potential carcinomas of the thyroid had been studied with tracer doses of I^{131}. Of these, 32 were benign (26 nodular goiters, 4 inflammatory, and 2 adenomas). Of the thyroid cancers, the undifferentiated grades II and III showed no uptake of radioiodine. Of 8 malignant adenomas, 7 showed uptake in bone metastasis. Fifteen tracer studies for metastasis were made. Studies were made also at the time of operation, to determine the efficacy of total thyroidectomy.

The present work is a preliminary study accompanied by excellent radioautographs showing the uptake of radioiodine in tissue. With regard to future plans, the authors state that in the cases of malignant adenomas with bone metastasis, and multiple tumors in the lateral neck, with or without involvement of the gland, treatment will consist of thyroidectomy, followed by from 50 to 100 mc. of radioiodine for bone metastasis if necessary. Patients with multiple lesions in the neck will receive a smaller prophylactic dose of radioiodine postoperatively. In most instances operative treatment is preferable to radioiodine for total removal of the thyroid; radioiodine therapy is believed to be too time-consuming.

MAURICE D. SACHS, M.D.

Factors Involved in the Experimental Therapy of Metastatic Thyroid Cancer with I^{131}. L. D. MARINELLI, J. B. TRUNNELL, R. F. HILL, and F. W. FOOTE. *Radiology*, 1948, 51: 553.

The treatment of metastatic cancer of the thyroid by radioactive iodine presents features of interest and importance. Efforts to localize radioelements in neoplastic cells have been made, but thus far a concentration of practical value has not been obtained. The experience gained in the last decade in the treatment of hyperthyroidism with I^{131} or I^{130} cannot be utilized fully in the treatment of cancer of the thyroid. In the case of hyperthyroidism, remission of symptoms is sought by partial inactivation of the thyroid gland, whereas in the case of cancer, radical devitalization of extensive tumor masses is attempted under conditions of differential uptake which, as a rule, are not as favorable.

In the course of the past year, 18 patients have been investigated to determine their suitability for treatment with I^{131}. In all of them metastases were present. The authors present one case in which satisfactory initial retention of I^{131} in the tumor warranted immediate experimental therapy with massive doses. The patient had a primary tumor excised in 1941. A month later, multiple bone metastases appeared. In 1944, it was found that the lesions concentrated I^{131}. Due to a lack of availability of isotopes in large quantities, the treatment was not begun until 1946. Two days after a small tracer dose, 60 millicuries of radioiodine I^{131} were given orally, and 7 days later a larger dose of 121 millicuries was given orally. Definite improvement followed. Soon afterward, however, an acute thyrotoxicosis developed. The hypothesis was advanced that under the influence of intracellular radiation, the thyroid follicle cells of the tumor had broken down, thereby releasing large amounts of thyroglobulin in the organism. A blood specimen taken at this time verified this hypothesis. The report of 26 micrograms of protein-bound iodine per 100 c.c. of plasma confirmed the suggested mechanism. The thyrotoxic symptoms cleared and the patient developed a carcinoma of the larynx which was treated by roentgen rays. Thyrotoxic symptoms reappeared on resuming isotope therapy. Propylthiouracil was administered for 76 days in an attempt to empty the tumors of their stored thyroglobulin. A dose of 122 millicuries of radioactive iodine was given at this time with no reaction of any kind. The patient has shown much improvement, having gained 55 pounds of weight, and he is able to drive his own car.

Preliminary results warrant further clinical trial of this type of therapy. FRANK L. HUSSEY, M.D.

Cancer of the Cervix Uteri. JOHN F. HYNES. *Am. J. Roentg.*, 1948, 60: 368.

This report consists of an analysis of 296 consecutive cases of cancer of the cervix uteri referred for treatment during the period from 1935 to 1944. A combination of roentgen and radium therapy with occasional supplementary intravaginal cone therapy was used, and the method is described. The radiation treatment is carried to the maximum tolerance level, and the total treatment is given in from 6 to 8 weeks. Unnecessary treatment to surrounding normal parts should be avoided. When indicated, supportive therapy is used to improve or maintain the general health of the patient and to reduce the frequency of radiation sickness.

The Schmitz classification is used in the staging of the disease, and lesions classified as stage 1 and stage 2 are considered operable.

The results are based on an analysis of 208 determinate cases. This includes all previously untreated lesions in patients who received treatment in this clinic, except 8 cases in patients dying of unrelated intercurrent disease and 1 case which was lost to follow-up when the patient was free of disease for more than 3 years. These 9 cases are classified as indeterminate along with cases which recurred after treatment elsewhere, cases in patients referred but not treated, and cases seen only in consultation.

The relation of survival to stage of the disease, age and race of patients, and duration of symptoms is tabulated. A relatively high incidence of associated syphilis is reported but this did not appear to influence the prognosis nor the response to treatment. The various complications following radiation therapy are recorded and discussed. A 3 year survival of 57 per cent of all cases and of 75 per cent of operable cases, and a 5 year survival of 51 per cent of all cases and of 71 per cent of "operable" cases are reported.

JOHN H. FREED, M.D.

Effects of Radiation on Hemopoiesis. JOHN S. LAWRENCE, ANDREW H. DOWDY, and WILLIAM N. VALENTINE. *Radiology*, 1948, 51: 400.

The authors present the observations of the various members of the Manhattan Project relative to the effects of radiation on the hemopoietic tissues. In considering the effects of radiation of hemopoiesis, the following facts should be recognized. The cells in the blood are relatively resistant to radiation. The peripheral blood picture produced by radiation is affected markedly at any one period following irradiation by the length of life of the different morphological elements in the peripheral blood. The effect of radiation on the peripheral blood picture is influenced by radiosensitivity of the various parent cells. The ability of the tissues to regenerate is of great importance.

The most worth-while observations of the effects of roentgen radiation applied to the body as a whole have been made on animals. In one study a large series of rats was used. These were divided into groups receiving different amounts (25 to 1,500 roentgens) of irradiation in single doses, and the findings in the animals were followed closely for 25 days. In another large series of rats, 550 roentgens were given to the whole body and blood studies were made at frequent intervals up to 41 days. Little change was noted in the red blood cells receiving 200 roentgens or less. Questionable changes occurred in the group receiving 300 to 500 roentgens during the first 168 hours. There was, however, appreciable reduction in both erythrocyte and hemoglobin levels between 168 and 448 hours. In animals receiving 600 to 800 roentgens, significant drops in both erythrocytes and hemoglobin were present at 168 hours; also, in the series given 550 roentgens to the whole body, a precipitous drop in red blood cells and hemoglobin levels occurred. Reticulocytes were not reduced when less than 100 roentgens were used. Marked reductions, however, occurred with dosages of 200 to 500 roentgens, beginning at 72 hours and persisting for 120 hours in the animals receiving 200 roentgens, and for 280 hours in those receiving 500 roentgens. Regeneration of reticulocytes became apparent at 168 to 280 hours in the groups receiving 600 to 800 roentgens. No significant changes in platelets were noted in those receiving less than 200 roentgens. Platelet reduction occurred in the rats receiving 300 to 500 roentgens after 120 to 168 hours. In rats receiving 500 to 800 roentgens, platelet reduction occurred by the fifth day. From 70 to 90 per cent of the leucocytes in the normal rat are lymphocytes. No unquestionable changes occurred in the neutrophils until dosages greater than 100 roentgens were used. A dosage of 25 roentgens was found to cause a drop in the lymphocyte level in 24 hours. It was found that the lymphocytes exposed to 550 roentgens were reduced as early as at 15 minutes after irradiation. With a single dose of 550 roentgens the effects of radiation injury in the lymph nodes were present at one hour after irradiation. At 6 hours after irradiation cytolysis of the cells in the lymph follicles had reached its maximum and the cellular débris was rapidly being removed by macrophages. Twenty-four hours after irradiation, regeneration and repair of the lymph nodes were actively progressing, and by the twentieth post-irradiation day regeneration was complete. It should be noted that the findings in the lymph nodes did not show good correlation with the peripheral blood picture, since the total number of the lymphocytes in the peripheral blood at the end of 25 days was still appreciably below normal. The changes in the spleen after irradiation followed closely those observed in the lymph nodes except that the whole process was somewhat more prolonged.

Regeneration was first observed between the thirtieth and the thirty-fifth hours after irradiation and was not complete until 40 days after exposure. Cellular destruction in the bone marrow reached its maximum between 2½ and 5 hours after irradiation. Most of the accumulated cellular débris was removed by the thirtieth postexposure hour. By the eighth day, hypoplasia was very severe, but at no time was complete aplasia observed. Active regeneration began approximately 12 days after irradiation and was completed on the fortieth day. The greatest reduction in the megakaryocytes occurred between the fourth and twelfth days, after which regeneration began.

Experimental studies on animals exposed repeatedly to small doses of roentgen and gamma radiation are more difficult to summarize. In every species studied a daily exposure of 10 roentgens per day resulted in detectable change in some of the hemopoietic elements within a year's time. Observations as to local area irradiation point to the fact that hemopoietic tissue not in the area exposed is not affected. The purpose of all of the studies which have been reviewed is to get a better idea of the effect of radiation on man.

FRANK L. HUSSEY, M.D.

MISCELLANEOUS

CLINICAL ENTITIES—GENERAL PHYSIOLOGICAL CONDITIONS

Precocious Puberty (Pubertad precoz). J. M. CAÑADELL, A. SECANELL and L. E. TERRADES. *Acta endocr. gyn.*, 1948, 1: 217.

Precocious puberty has many symptoms, all of them referring to an exaggerated, earlier than normal, sexual development. Along with this are the secondary changes which usually follow, such as quality of voice and distribution of hair. The etiopathogenesis permits classification into (1) constitutional, (2) endocrine, and (3) cerebral groups. The last includes those cases which are of a meningoencephalitic, hydrocephalic, or of intracranial tumor origin. The constitutional type is the most frequent of the three examples which are reported.

The first was a case of hypothalamohypophysis anomaly, which demonstrated the characteristic findings of sexual alterations: hypogonadism, hyperostosis of the frontal bones, angiomatous nevi, and obesity. These changes were placed on familiar and hereditary bases. The second case revealed obesity, alterations of the sella turcica, and ovarian hypofunction, and the third showed the usual morphologic changes and the presence of active gonadotropic and estrogenic substances, but there was no progesterone obtainable. Cyclic menses with ovulation resulted. The fourth case of suprarenal hyperfunction associated with neoplasm of the left gland is described as an example of the endocrine type, which also included pineal body, suprarenal, and other gonadic dysfunctions. Extremely high elimination of 17-ketosteroids characterized this last case.

STEPHEN A. ZIEMAN, M.D.

Hypervitaminosis A. Report of 2 Cases in Infants. PHILLIP E. ROTHMAN and E. ELIZABETH LEON. *Radiology*, 1948, 51: 368.

The current popularity of vitamin preparations requires the physician to be alert for signs of overdosage. Two cases of hypervitaminosis A in infants over one year of age are presented by these authors. In each child the daily intake of vitamin A was estimated to be in excess of 100,000 international units.

The salient clinical features include a history of excessive intake of vitamin A preparations, anorexia with failure to gain weight, irritability, bone sensitivity, sparse hair, cracking of the lips, hepatomegaly, and generalized pruritus. Roentgenographic examination shows evidence of periosteal proliferation, most common in the ulna. Increased vitamin A and carotene levels in the blood are further diagnostic aids. In one child a yellowish tinge to the skin was present.

The treatment consists of discontinuing vitamin A preparations and the reduction of foods containing a high content of vitamin A. Both patients responded clinically to this treatment in 10 to 24 days, although the blood levels of carotene and vitamin A did not fall to normal for several months.

A similarity exists between bone changes in infantile cortical hyperostoses and hypervitaminosis A. The former differs clinically in the absence of a history of excessive intake of vitamin A, the presence of fever, a subacute course with recurrences, and onset usually before the age of one year. The periosteal reaction in infantile cortical hyperostoses involves principally the mandible, and frequently a lamellated appearance is seen in the film, indicative of the recurrent course of the disease.

According to the authors, the huge capacity of the liver to store vitamin A rarely necessitates the administration of vitamin A in excess of 5,000 international units. A bibliography of experimental and clinical studies on vitamin A is presented.

JOHN L. BELL, M.D.

Clinical and Experimental Study of Thyroinhibitory Substances. Comparative Experimental Study of Main Derivatives of Thiourea (Ricerche cliniche e sperimentali sulle sostanze tireoinibitrici. Studio sperimentale comparativo sui principali derivati tioureici). LUIGI PARODI and MARIO DE GREGORI. *Arch. ital. chir.*, 1948, 70: 199.

In addition to thiourea, the following substances have been investigated in regard to their inhibitory effect on hyperthyroidism: derivatives of the aliphatic series, such as diethylthiourea and thiosinamine; derivatives of the aromatic series, such as phenylthiourea; derivatives of the heterocyclic series, such as thiouracil, methyluracil, aminothiazole, thiobarbituric acid, aminothiodiazole, and aminoethylthiodiazole.

The authors studied the effect of thiouracil, methylthiouracil, and aminothiazole on the histologic structure of the thyroid gland, hypophysis, thymus, and other organs, and the peripheral and medullary blood, and made histochemical determinations of glycogen in the liver, and of calcium, sugar, nitrogen, cholesterin, fibrinogen, and prothrombin in the blood.

The experiments were performed on albino mice, guinea pigs, and dogs. The goitrogenic effect was estimated by calculating the ratio of the thyroid gland removed at the autopsy to the body weight of the animal.

Two classes of phenomena produced by thyroinhibitory substances may be distinguished: initial changes (the intensity being in proportion to the dose of the drug) which are the result of the toxic-necrotic effect of the substance administered, and later changes which are, to a certain degree, independent from the entire dose, and due to the specific inhibitory effect of the substance on the thyroid gland.

During the first 2 to 5 days after the beginning of the experiment the following changes take place in the thyroid gland: hyperemia of the glandular tissue, nuclear pyknosis, desquamation of the follicular epithelium, and the appearance of hemorrhagic and necrotic-degenerative foci. Later on a liquefaction and absorption of the colloid substance, and hypertrophy and hyperplasia of cellular structures of the follicular epithelium take place.

The greatest sensitiveness to the substances studied was found in mice, then in guinea pigs and dogs. The smaller the regressive changes, the greater the intensity and rapidity of the appearance of hypertrophy and hyperplasia. The regressive lesions were more pronounced after administration of aminothiazole than after thiouracil or methylthiouracil.

The goitrogenic effect of methylthiouracil was stronger than that of thiouracil, while aminothiazole had the weakest effect.

Thyroinhibitory substances produce a deficiency of thyroxin with a resulting compensatory increase of the secretion of thyrotropic hormone by the anterior lobe of the pituitary gland. This hormone stimulates the thyroid gland in an abnormal manner so that vacuolization and absorption of the colloid substance, and hypertrophy and hyperplasia of the follicular epithelium take place.

The authors were not able to detect any histologic modifications in the hypophysis. The following changes were noticed in the blood: diminution of hemoglobin and in the number of red and white blood corpuscles, neutropenia, and relative lymphocytosis. The examination of the bone marrow did not show any changes. The sugar and nitrogen contents of the blood fell. This was probably due to a diminished metabolic activity. The amount of cholesterin in the blood increased in the course of the experiments. JOSEPH K. NARAT, M.D.

The Relationship Between Heparin Dosage and Clotting Time. L. B. JACQUES and ANN G. RICKER. *Blood*, 1948, 3: 1197.

The authors have studied the effect of heparin dosage on the clotting time in the dog, both in vitro and in vivo. It was found that the clotting time reached a maximum in 5 to 15 minutes after the intravenous injection of moderate doses of heparin, and that this maximum clotting time was greater than that occurring when the same amount of heparin was added to the blood in vitro, because of the increased anticoagulant effect of heparin which is incubated with blood. Clotting times returned to normal after short intervals and were constant with given dosages.

The clotting time response to certain concentrations of heparin added to the blood in vitro was considered a measure of the sensitivity of the clotting system to heparin. The clotting time response to a fixed dose of heparin injected intravenously was considered a measure of the body's ability to remove heparin from the circulation, when interpreted in the light of the in vitro response.

This test was then used on animals subjected to anesthesia with pentobarbital, ether, or urethane, the injection of India ink (reticuloendothelial blockade), removal of both kidneys, and removal of the gastrointestinal tract. The results indicated that neither the reticuloendothelial system, the kidneys nor the gastrointestinal tract were involved in the disappearance of heparin from the circulation, since none of these procedures had any effect on the duration of heparin action in the body.

When the sensitivity of the blood to the anticoagulant action of heparin was tested, pentobarbital and nephrectomy had no effect, ether caused an increase in sensitivity, and urethane, India ink and evisceration caused a decrease. Coagulability of the blood was decreased by pentobarbital, increased by India ink and evisceration, and little affected by urethane, ether, or nephrectomy.

S. LLOYD TEITELMAN, M.D.

Circulating Anticoagulant as a Cause of Hemorrhagic Diathesis in Man. C. LOCKARD CONLEY, HOWARD K. RATHBUN, WILLIAM I. MORSE, II, and JAMES E. ROBINSON, JR. *Bull. Johns Hopkins Hosp.*, 1948, 83: 288.

The hemorrhagic syndromes are generally explained on the basis of a deficiency of one of the plasma components necessary for coagulation. While this may be true in a majority of cases, the authors present evidence to show that abnormal bleeding may be due to the spontaneous occurrence of an anticoagulant in the blood.

Three cases of abnormal bleeding are presented, with clotting times of 68 minutes, 60 minutes, and 5 hours. The last is a hemophiliac, but neither of the other cases showed any laboratory findings to explain the increased clotting times. All three cases were found to have circulating anticoagulant by the following procedure. Fresh, whole blood from each case was centrifuged and the supernatant plasma was found to be free of platelets and remained clot-free indefinitely. When small amounts of this plasma were added to portions of normal blood, the coagulation time of the latter was prolonged, indicating the presence of some anticoagulant in the plasma specimens. Similarly prepared plasma from normal persons or from unaffected hemophiliacs had no effect on the clotting time of normal blood.

Studies were made to determine the nature of these anticoagulants. Toluidine blue and protamine, which counteract the effect of heparin in normal blood, had no effect on the clotting times of these patients so it seems that the unknown clotting inhibitors are not related to heparin. Assays revealed normal values for proteolytic enzyme and proteolytic enzyme inhibitor in all 3 patients. The anticoagulant was apparently unaffected by heat at 65 degrees centigrade for 5 minutes.

Plasma mixtures containing measured amounts of thrombin and the plasma under study were prepared, and subsequent thrombin times showed no variation from controls. This suggests that the anticoagulant

does not act by an antithrombic mechanism. Similar mixtures with controlled prothrombin content showed similar results except that one patient (not the hemophiliac) who had had a slightly prolonged prothrombin time clinically, showed a persistence of this finding. Thus, the prolonged prothrombin time of this individual was apparently due to the unknown anticoagulant in his blood.

With the addition of adequate thromboplastin the plasma specimens clotted immediately, and while lesser concentrations of thromboplastin had varied effects, it seems that the anticoagulant may act by preventing the formation of thromboplastin in some way.

Several cases of atypical hemorrhagic syndromes are reviewed from the literature and it is suggested that many of these may have been caused by circulating anticoagulants such as are reported here. Anticoagulant assays of all blood exhibiting prolonged clotting times will likely reveal many more such cases. No therapy is known for this condition.

STANLEY W. TUELL, M.D.

Ischial Decubitus Ulcer. ERNEST BORS and A. ESTIN COMARR. *Surgery*, 1948, 24: 680.

This article summarizes the author's experience with 47 ischial decubitus ulcers in 41 patients on a paraplegic service. These ulcers were not dependent upon the nutrition of the patients nor did they appear to be related to the level of the spinal cord lesion. The sore-free interval varied greatly, from 3 months to 13 years, after which the local trauma of weight-bearing pressure broke the urine-moist skin. Atrophy of the gluteal muscles and absence of adequate soft tissue between skin and ischial tuberosity were believed to be contributing factors.

Systemic preoperative preparation consisted of the correction of hypoproteinemia and avitaminosis, liberal transfusions of whole blood, and the administration of both penicillin and sulfonamides. Local treatment of the wound consisted of simple débridement.

Operative treatment of the simple ulcer with bursa formation was confined to excision, with suturing of a protective layer of gluteus maximus muscle over the tuberosity and closure of the skin margins. For the more frequently encountered deep ulcer which had involved the bone, removal of the ulcer and bone en bloc was performed. Two methods of closure were then employed. In one (the "primary method"), redundant gluteal musculature was pulled over the bone defect by means of stainless steel wire sutures. In the "secondary method," a medially pedicled flap of gluteal muscle was brought down over the bony prominence. In both procedures steel wire was used to close the skin, and the wounds were drained. Fluff gauze pressure dressings were applied, and partial immobilization was achieved by the use of an Ace bandage spica.

With this type of treatment, cures were effected in 85.1 per cent of the cases. One operation was sufficient in 66 per cent of the patients; in another 19 per cent, success was achieved after more than one intervention. Comparison of the rates of recurrence and of numbers of cases requiring more than one operation makes the "secondary method" seem slightly more desirable. Of the 7 failures (15 per cent of the series) the first one may be attributed to faulty interpretation of roentgenograms wherein the bone changes were unrecognized and hence untreated. A second failure resulted from a series of unfortunate postoperative incidents. A third patient, whose repair failed to hold, had a periproctitis and sat up for unduly long periods during the healing of the wound. Two other patients also sat for unduly long periods, driving their cars. A sixth patient developed a postoperative hematoma in spite of the use of drains in the wound. The seventh patient left the hospital on an emergency leave before the scar had become stable.

The authors advocate early use of braces and thorough instruction of the patients as prophylaxis against the development of ulcers.

BENJAMIN F. LOUNSBURY, M.D.

Skin Lesions Due to Pitch and Tar. PHILIP ROSS. *Brit. M. J.*, 1948, 2: 369.

The widespread use of tar and pitch for various industrial purposes has led to an appreciable incidence of skin lesions among workers who repeatedly handle these materials. Tar is produced by the distillation of coal, and pitch is the residue left after the distillation of tar. Both materials contain hydrocarbons of varying complexity, one of which, benzpyrene, is carcinogenic. In addition, heavier oils, tar, and pitch have the following common characteristics: they are all skin irritants; they are solvents of lipoid and cholesterol; and they are auxetic and keratoplastic.

In his own experience, the author has been unable to differentiate between the effects of the two materials, but he has noted the following types of reaction: tar burn; tar erythema; allergic eczematous dermatitis; folliculitis, acne, and comedones; pitch and tar melanosis; shagreen skin; neoplastic changes; and epitheliomas. Tar erythema follows the action of bright sunlight on skin rendered sensitive by some as yet unknown ingredient in pitch and tar. The ultraviolet of sunlight appears also related to the development of epithelioma, accelerating the action of the carcinogen in tar and pitch by some mysterious mechanism, for skin malignancy has occurred much more rapidly in country workers than in city workers whose environment differs appreciably only in that they are exposed to much less sunshine. The earliest macroscopic change resulting from tar and pitch exposure is seen in the cornified layer of the skin, where keratoses occur. Somewhat later the papillomas—simple wart, typical pitch wart, and soft papillomas—appear on the face, neck, scrotum, forearms, and backs of the hands.

By way of prophylaxis against these skin changes, and especially against the development of malignant changes which may occur years after the exposure

has ceased, certain suggestions are made. Workmen's clothing should be relatively impermeable, secured at ankles, wrist, and neck, and it should be changed frequently. Protective gauntlets and goggles should be worn. Barrier creams should be applied to all susceptible parts of the body before each working shift, and a thorough bath should be taken after each shift. Frequent inspection of the skin of exposed employes is essential to prophylaxis as well as to treatment of established lesions.

This article contains 6 good color plates depicting typical skin lesions, statistical tables on the situation and latent periods of the various lesions, and a formula for starch-kaolin paste used to prevent tar erythyma. BENJAMIN F. LOUNSBURY, M.D.

Acanthosis Nigricans and Plastic Surgery (Acanthosis nigricans et chirurgie plastique). GEORGES CLOUTIER and PAUL POIRIER. *Union. méd. Canada*, 1948, 77: 921.

Plastic surgery as an adjunct in the management of far advanced acanthosis nigricans is discussed by these authors. The case of a 22 year old female with chronic dermatitis of 6 years' duration is presented. On physical examination and subsequent biopsy the skin lesions were typical of acanthosis nigricans, involving chiefly the cervical, axillary, mammillary, and inguinal regions and manifesting itself by exaggeration of the normal folds of the skin, numerous papillary excrescences, and hyperpigmentation. The involved skin of both axillary regions was removed and replaced by skin grafts from both thighs in three operative procedures. A good cosmetic and functional result was obtained.

History revealed carcinoma in 2 immediate relatives. Laboratory studies disclosed an elevated basal metabolic rate on 2 occasions. The remaining portions of the history, physical, and laboratory examination were not contributory.

Acanthosis nigricans is a disease of the skin characterized by an exaggeration of the normal skin folds with papillary growths and hyperpigmentation. Its frequent occurrence in cases of intra-abdominal carcinoma has been noted. Although its etiology and pathogenesis are for the most part unknown, endocrine factors are believed important, as was shown by the elevated basal metabolism in this patient. The author distinguishes two types: the juvenile (benign) and the adult (those cases usually associated with intra-abdominal adenocarcinoma).

C. FREDERICK KITTLE, M.D.

Pigment Nephropathy in Battle Casualties. HOWARD E. SNYDER and JAMES W. CULBERTSON. *Arch. Surg.*, 1948, 56: 651.

Deaths among soldiers of the Fifth Army who were wounded in battle during the period from January 1, 1944 to May 31, 1945 included 99 in whom pigment nephropathy was a direct or indirect cause, and another 57 in whom this syndrome was suspected of contributing to a fatal outcome. Of the 1,411 deaths on which reports were available, 68 were believed to be caused directly by pigment nephropathy, whereas in another 31 it was at least a contributing cause. Autopsy was performed in 90 of these 99 cases.

Although the authors describe pigment nephropathy or lower nephron nephrosis in connection with battle casualties, they point out that it may occur in a variety of traumatic situations. In wounded soldiers the condition consists of progressive oliguria and anuria developing in patients who have undergone extensive surgery after resuscitation from shock and who appear to be recovering. Those patients most severely affected die in from 4 to 8 days after being wounded. The renal damage appears to stem from ischemia of the kidney and concomitant excretion of pigment, either hemoglobin (from transfused blood, intravascular hemolysis, or other sources) or myoglobin (from extensive crushing of muscle). The ischemia is vasoconstrictive in nature, but it has not been determined whether the vasoconstriction results from the action of a toxin liberated from injured tissues or is a reflex phenomenon.

Analysis of the 99 deaths shows that in most instances the primary wounds were relatively severe. There were many associated wounds of varying severity. All but 5 of the patients had been in shock of some degree. Four of the 5 had sustained a transfusion reaction, crush injury, or poisoning by sulfa drugs, whereas the record of the fifth was so inadequate as to permit of no valid conclusions. The data on recorded blood pressures and amounts of plasma and blood administered serve as rough measures of the degree and duration of the shock. As a further indication of the severity of the wounds, it is noted that in the 26 cases for which the operating time was stated, only 1 case required an operating time of less than an hour, whereas 17 cases required 3 hours or more.

The authors discuss the work of investigators who have studied the syndrome in experimental animals, and the observations of clinicians. They conclude that treatment should be prophylactic. Shock should be combated and blood volume restored to normal as soon as possible. They feel that oxygen therapy should be employed more often, to combat the anoxia which must result from vasoconstriction in the renal circulation. Since dehydration has been established as an etiologic factor they advocate adequate hydration of the patient as soon as possible. When used, sulfa drugs must be carefully administered and the patient closely observed. Where the potentialities exist for nephropathy, such drugs should be discontinued.

BENJAMIN F. LOUNSBURY, M.D.

Necrotic Lesions of the Leg in Arteriosclerosis. EDWARD A. EDWARDS. *N. England J. M.*, 1948, 239: 571.

Six cases of arteriosclerotic necrosis of the skin and subcutaneous tissue of the lower extremities are presented. This condition carries the same import as necrosis of the toes or feet; it may arise spontaneous-

ly or may follow local trauma or infection. Because of the advanced age of the patients and the marked arteriosclerosis, the tissues limit infection poorly and septicemia is common. It is frequently accompanied by thrombosis of the deep veins, and pulmonary embolism may occur.

Treatment usually requires hospitalization and an attempt to control infection by chemotherapy. If necrosis is widespread and deep, or if infection is spreading rapidly, amputation should be carried out immediately. The author favors the local use of tyrothricin solution with systemic chemotherapy. If venous thrombosis is present, the femoral veins should be ligated; if not present, dicumerol or heparin should be given. Lumbar sympathectomy should be considered if there is a good skin temperature response to spinal anesthesia and if there appears to be a good chance of saving the leg. If varicose veins are the cause of local infection, these should be treated by high ligation of the saphenous vein. A decision as to the need of amputation should be made as soon as possible. ROBERT MAYO TENERY, M.D.

Fibrinolysis; Its Mechanism and Significance. R. G. MACFARLANE and ROSEMARY BIGGS. *Blood*, 1948, 3: 1167.

The authors define fibrinolysis as the aseptic dissolution of fibrin brought about by the direct action of a mechanism existing in normal blood. Although fibrin in sterile whole blood usually remains intact for days or weeks, rapid dissolution of fibrin may occur following a variety of disturbances to the living organism. Fibrinolysis is probably the result of proteolytic digestion by an enzyme.

Previous experimental work has shown that a proteolytic enzyme present in serum ("plasmin") is activated by chloroform which destroys some substance acting as a normal inhibitor ("antiplasmin"). Fractionation of plasma proteins may also result in proteolytic activity by separating enzyme and inhibitor. Recent studies have shown that streptococcal filtrate ("streptokinase") causes liberation of a proteolytic enzyme in plasma or serum by activating its precursor ("plasminogen"). Thus fibrinolysis, whether induced by streptokinase, chloroform, fractionation, or disturbances in the living subject, is due to active plasmin, which will also digest plasma proteins, casein, and gelatin.

Antiplasmin is associated with the albumin fraction of the plasma, whereas plasmin and plasminogen are associated with the globulin fraction. Enzymes resembling plasmin have been found in various tissues, especially of the lung and urine; and inhibitors resembling antiplasmin have also been found in various tissues, particularly in splenic tissue.

Observations in the living subject indicate that fibrinolysis may occur following such stimuli as trauma, fear, severe exercise, or the injection of adrenalin. The mechanism of plasmin activation in such cases is obscure and can be obtained in the absence of normal function of the liver, pancreas, spleen, and suprarenal cortex. Cumulative evidence suggests that the plasmin-antiplasmin complex plays a fundamental part in several essential physiologic processes such as shock, protein breakdown-synthesis equilibrium, blood coagulation, and allergic reactions. S. LLOYD TEITELMAN, M.D.

Energy Mechanisms in Malignant Tumors in Relation to Chemotherapy. MAURICE M. BLACK, ISRAEL S. KLEINER, and HERMAN BOLKER. *Cancer Res.*, 1948, 7: 818.

The differences in metabolism between normal and malignant tissues have been the basis for many attempts to develop chemotherapeutic measures. A new approach toward a rational chemotherapy of malignant tumors seems indicated in terms of the energy-rich phosphate bond. Thus if malignant cells are particularly dependent on the glycolytic mechanism for their energy requirements, it might be possible to inhibit their activity if one could selectively limit the formation or utilization of these bonds.

Based on this concept, an hypothesis of biochemical function in malignant tissue as compared with normal was formulated as follows: with the advent of malignancy there is a significant alteration in the energy mechanism of tissue. The preferred pathways involve the glycolytic mechanisms while the respiratory enzyme reactions are diminished as compared with their role in normal tissue. The respiratory functional potentiality is not absent but merely residual. The glycolytic mechanism itself may be divided into (a) the primary portion from triose to lactic acid, and (b) the tricarboxylic acid cycle which is a secondary mechanism for energy production.

To obtain maximum destruction of energy-yielding reactions in malignant tissue, inhibition of the primary glycolytic mechanism would occur at the points of creation of the high energy phosphate bonds. Such reactions are inhibited by iodoacetic acid and sodium fluoride. Adaptation of malignant tissue to these inhibitors occurs and is associated with utilization of a secondary mechansim for energy production. The tricarboxylic acid cycle is a likely secondary pathway. Inhibition of the cycle could be accomplished by the use of malonic acid which inhibits the succinic dehydrogenase system. Further adaptation after initial sensitivity of the malignant tissue to the glycolytic inhibitors would occur. This might well be accomplished over the diminished metabolic pathways, that is, those using the respiratory enzyme chains, particularly cytochrome oxidase. Such reactions might be inhibited by the use of oxide which blocks oxidase activity.

This report gives the results of preliminary experiments based on the concepts mentioned above. The various inhibitors were administered orally, in divided doses, to patients with the following diseases: acute myeloblastic leucemia in 10 patients; acute lymphatic leucemia in 4; acute monoblastic leucemia in 1; gastric carcinoma in 2; lymphosarcoma in 1; carcinoma of the colon in 3; carcinoma of the lung in 4; carcinoma of the testis in 2; and Hodgkins disease in 3.

The therapeutic response observed, as well as the striking similarity between the calculated dose and the actual dose needed to produce therapeutic effects, lends support to the validity of the original thesis upon which these studies were undertaken.

It is also significant that the observations reported here give insight into the mechanism of adaptation by malignant cells. Although the phenomenon of adaptation still constitutes a major limitation in this and other chemotherapeutic modalities, it appears that it does not involve the creation of enzymatic mechanisms *de novo*, but rather the utilization of previously existent secondary pathways.

There were no deleterious effects observed, particularly as regards the retina and intestinal mucosa. These tissues have been reported as having metabolic activity similar to neoplastic tissue, particularly with regard to a high glycolytic activity.

DAVID H. LYNN, M.D.

Review of the Problem of Air Contamination in Operating Rooms and of the Diverse Procedures of Air Sterilization (Revue sur le problème de la contamination de l'air des locaux opératoires et sur les divers procédés de stérilization de l'air). FERNAND MASMONTEIL and MARC FLEUROT. *Rev. chir.*, Par., 1948, 67: 146.

Dust particles containing bacilli may travel in the air either in dry form or as minute droplets of about 0.1 micron in diameter. A number of physical factors contribute to purify the air from bacterial contamination, and have been used in attempts to sterilize the air. Rise of the temperature causes evaporation, and lowering of the temperature causes condensation and precipitation of these droplets. A cold object brought into a warmer room causes condensation of droplets on its surface. Therefore, it is dangerous to bring a tray with sterile instruments into an unsterilized warm operating room. If the temperature of the tray is lower than that of the room, droplets containing bacteria will precipitate on its surface.

Other physical factors that have been used for purifying purposes are lowering of the air pressure, high humidity leading to precipitation, ultraviolet rays, radioactivity, electric ionization, and filtration of the air through different absorbing materials.

Also, a great number of chemical substances have been used for air sterilization, especially oxidizing agents (ozone, formalin, glycol propylene, and others). However, they are inconvenient because of their odor and irritation of the respiratory passages, or they are too expensive or not effective, or both.

The authors criticize the different methods in use at the present time. They have devised a method which they claim to be effective, rapid, and economical: before an operation, the air of the operating room is saturated with water vapor until a dense mist forms. The very small droplets of this mist fix immediately the small dust particles containing bacteria. This mist is then condensed on the surfaces of a large condenser which is cooled by water.

WERNER M. SOLMITZ, M.D.

Biologic Studies of Surgical Shock. Paroxysmal Arterial Hypertension Following Any Tissue Trauma is Due to Adrenalin Secretion by the Suprarenal Gland (Étude biologique du choc chirurgical. L'hypertension artérielle paroxystique secondaire a tout traumatisme tissulaire est due à une décharge adrénalinique des surrénales). J. DRIESSENS. *Rev. chir.*, Par., 1948, 67: 129.

In an earlier publication the author showed that the drop of the blood pressure in surgical shock is always preceded by a very short period of marked hypertension. By systematic continuous registration of the pressure inside of the carotid artery it could be demonstrated that this hypertensive period consists of a sequence of momentary, very transitory shocks which are of too brief duration to be observed with the usual sphygmomanometer.

In the present article the author reports a series of experiments on the curarized dog to prove that the hypertension preceding the hypotension of shock is due to the secretion of adrenalin which is caused by traumatism of the tissue.

The hypertension lasts only a few seconds, the blood pressure rising about 25 to 30 seconds above the normal level. It can be repeated any number of times by a new trauma in the same animal (cutting of the skin, manipulation of the intestine, or severing of a portion of muscle). Parallel to the hypertension, there occurs hyperglycemia, a further proof of the adrenogenic nature of the hypertension. By the intravenous injection of adrenalin the same characteristic curve of the elevated blood pressure and hyperglycemia can be brought about.

Furthermore, the volume of the spleen was measured in a plethysmograph, and it was shown that the volume decreased considerably with each trauma exerted on the curarized animal.

When the lumboadrenal vein was ligated proximally and distally to the gland, subsequent traumatism failed to produce hypertension and hyperglycemia. When the splanchnic nerves were paralyzed by cocaine infiltration, subsequent trauma produced only a very slight elevation of the blood pressure.

WERNER M. SOLMITZ, M.D.

EXPERIMENTAL SURGERY

Attempts at the Production of Experimental Neoplasms by the Injection of Thorotrast (Tierexperimentelle Untersuchungen zur Frage der Geschwulstentstehung durch intravenoese Thorotrastinjectionen). LUDWIG RULAND. *Chirurg*, 1947, 17–18: 540.

The author states that several writers have remarked that a tumor-forming process may require a latent period of from 10 to 25 years in the human before the neoplasm comes into being. In certain animals, latent periods have been accurately worked out for carcinogenic agents. Thus, the author decided to observe a series of animals beyond the maximum of the latent period to observe the carcinogenic properties of a 25 per cent colloidal suspension of thorium dioxide.

Three factors demanded consideration: (1) the continued action of the thorium as an irritating foreign body in the tissues, (2) the radioactivity of the thorium, and (3) the susceptibility of the animal to carcinogenesis. In these experiments both rats and guinea pigs were employed. A point of lessened resistance was produced by fracturing the tibia at the epiphysis, a point of active growth.

The animals were given an autopsy examination if death occurred from an intercurrent disease, or they were sacrificed at 26 months. Although active thorium dioxide was found in the areas of the trauma, and although an active chronic inflammatory reaction was often present, no tumors were found in any of the animals. The author believes that the processes which were observed may be interpreted as precancerous manifestations.

He concludes that these experiments are equivocal, and should not be used for an interpretation of what may occur in man. The latent period for the observance of cancer in patients who have received injections of thorium has not yet been reached as this material did not become available for general use until 1934. Also, the changes which he saw in his animals might be more progressive in man.

WILLIAM C. BECK, M.D.

Amputation of the Canine Atrial Appendages. H. K. HELLERSTEIN, E. SINAIKO, and M. DOLGIN. *Surgery*, 1948, 24: 719.

The left atrial appendage is frequently the site of thrombus formation and the source of the multiple arterial emboli which often complicate rheumatic mitral disease. Since there is no effective treatment for this condition, surgical excision of the involved atrial appendage is suggested as a possible solution.

To test the feasibility of such a procedure, the left atrial appendage was surgically removed from 5 dogs; the right atrial appendage was excised in 2 dogs, and in 1 dog both appendages were removed. The procedure generally used was simple clamping at the base of the appendage, ligation, amputation, and a reinforcing transfixion suture. An anterior intercostal approach was used, with or without rib resection. Each dog received 200,000 units of penicillin daily for 2 weeks postoperatively, and serial electrocardiograms were taken.

One dog died 15 minutes after the closure of the incision. The other seven dogs recovered uneventfully and were active and normal in appearance within 7 days. Follow-up electrocardiograms showed no changes indicative of myocardial damage or abnormal atrial rhythm, except that one dog had a transient intra-atrial block. Autopsies, performed 4 to 12 weeks postoperatively, revealed excellent healing of the atrial incisions in all dogs, with complete endothelialization of the endocardial surface. No mural thrombi were found. Firm adhesions were present between the visceral and parietal pericardium at the stump of the atrial appendage. There was no evidence of emboli or infarction in any other organs. The histologic report verified the gross observation of firm healing of the atrial incisions.

It is concluded that one or both atrial appendages may be surgically excised in the normal dog without significantly altering the normal physiology of the heart. The feasibility of this procedure in patients with atrial appendages containing mural thrombi deserves further consideration. The atrial appendages may provide a more convenient approach in intracardiac surgery than the ventricular approach.

STANLEY W. TUELL, M.D.